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INNOVATE Through Hard Times Page 62

GENERATE NEW IDEAS On The Fly Page 90

Keep Your PRODUCTS, PROCESSES And RELATIONSHIPS Fresh Pages 72, 78, 84

The 14th Annual CIO-100

Meet the New INNOVATION GENERATION

Page 52

PLUS **Insights on the Practice of Innovation from Gary Hamel, Michael Schrage, Thomas Kuczmarski, Anita McGahan, Howard Rubin** Page 116

The coveted five nines. In the past, only a precious few were allowed to see them.

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VOL. 14 • NO. 21 • AUGUST 15, 2001

SPECIAL ISSUE: THE 14TH ANNUAL CIO-100

BEGINS ON PAGE 52

INNOVATION

Features

Innovation Generation 52

OVERVIEW This year's CIO-100 honorees stay ahead of the pack by creating breakthroughs in products, relationships and processes. *By Sandy Kendall*

Hard Times Are the Best Times 62

INVESTING DURING SLOWDOWNS Companies that innovate during difficult times are forced to be creative. Dollar Rent A Car, FedEx, TruServ and 3M know that, and they're reaping the profits. *By Lee Pender*

Twist and Spout 72

PRODUCT DEVELOPMENT Nothing is forever. When the carton started taking a hit from its plastic-jug competitors, International Paper had to rethink its core product. Quickly. *By Ben Worthen*

Concrete Ideas 78

BUSINESS PROCESSES Even an old-line cement company can be innovative when it comes to business process redesign. Here's how Cemex keeps track of its trucks, its orders and the weather. *By Simone Kaplan*

Got Soy 84

RELATIONSHIPS The health food market is booming. To capitalize on the fervor, General Mills and DuPont formed a unique partnership in an effort to get soy to market. *By Stewart L. Deck*

MORE ▶▶▶

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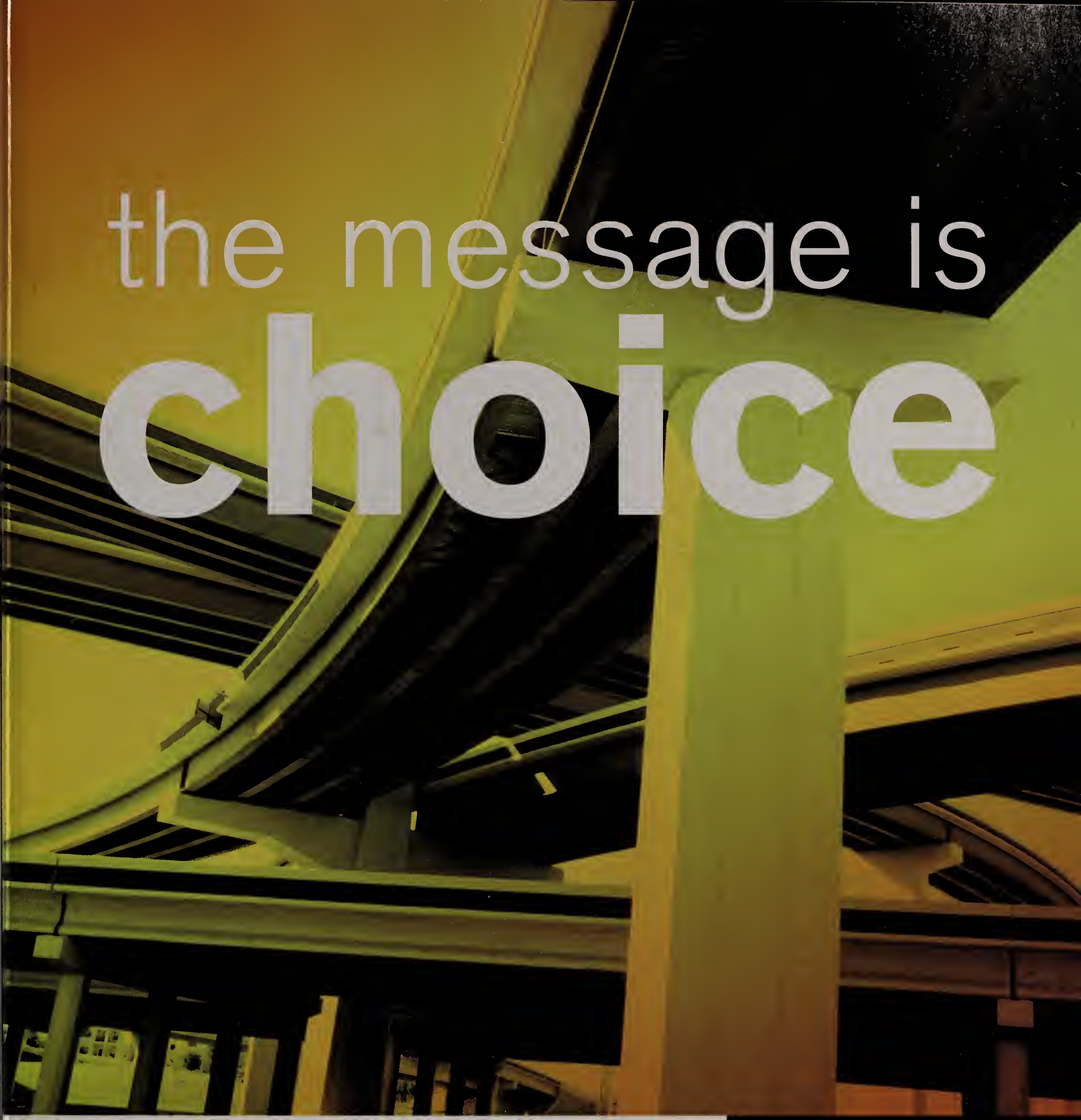

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CIO

Features, *continued*

Quick Change Artists 90

BEST PRACTICES Seven secrets to make change in a hurry. *By Stephanie Overby*

Green Lights 101

ENVIRONMENT If you're looking for innovative ideas, look to the environment. *By Meg Mitchell Moore*

What Makes Sheila Run 106

THE CIO ROLE: MARTHA STEWART'S OMNIMEDIA When you're Martha Stewart's CIO, maintaining a website that mimics your boss's perfectionism is just part of the job. *By Meridith Levinson*

How Things Change 116

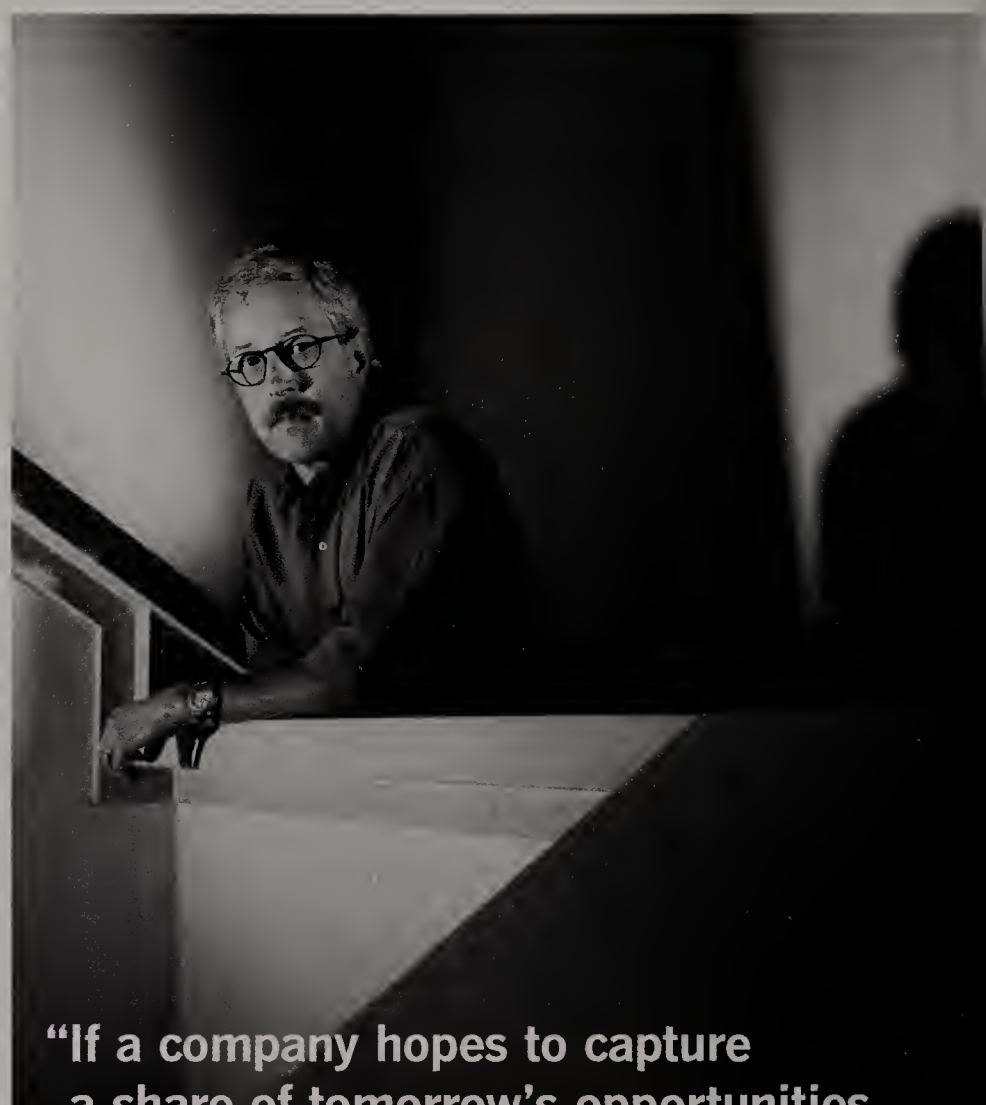
THINK TANK Thomas Kuczmarski, Gary Hamel, Anita McGahan, Howard Rubin and Michael Schrage reveal their take on innovation. *By Sandy Kendall*

Good Idea, Bad Timing 129

NEW FIELDS OF OPPORTUNITY A look at five products that could have been great. *By Derek Slater and Joe Sullivan*

The Honorees 132

THE LIST The 2001 CIO-100 honorees



Sections

Trendlines 26

Time management; International business; Hardware. *And more*

WASHINGTON WATCH
Taxing questions and the online border patrol. 30

OFF THE SHELF
Mergers and acquisitions, and leadership top CIOs' reading list this month. 46

Emerging Technology 146

Choosing how to make existing apps road-ready. *By J. Brown*

PREDICTIONS
Ethernet market 152

REVISIT
Data warehousing 157

UNDER DEVELOPMENT
New memory 160

Departments

From the Editor 16

By Abbie Lundberg

InBox 18

Reader feedback

Index 164

Lighten Up 168

TIME PIECE Thomas Edison invented the lightbulb. Or did he? *By Sara Shay*

COVER PHOTOS TOP (LEFT TO RIGHT) BY STEVE NEIDORF, JEFF SCIORTINO, DANNY TURNER, JENNY THOMAS, STEVE RAWLS, JIM GRAHAM, LEWIS TOBY, JOHN SOARES, PER BREIEHAGEN; BOTTOM BY PER BREIEHAGEN, RALPH COLE, STEVE MICROS, JEFF SCIORTINO, JAY BLAKESBURG, BERND AVERS, LANNY NAGLER, STEVE NEIDORF, JACK KENNER

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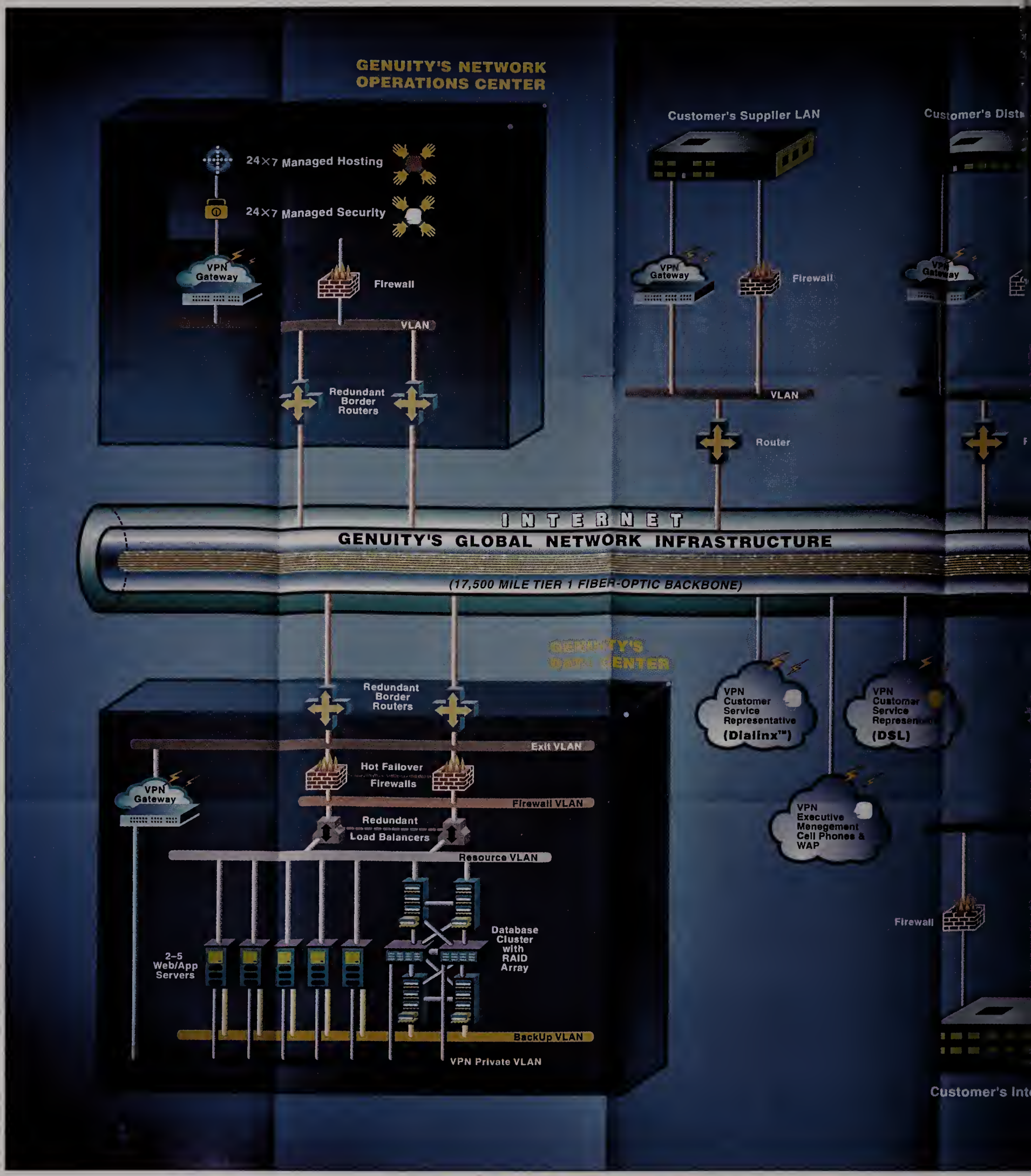

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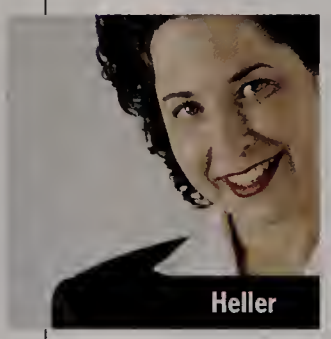
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From the Editor

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For more information on all our awards programs—the CIO-100, the Enterprise Value Awards and the CIO Web Business 50—go to *www.cio.com/awards.html.*

Innovation Is Basic

In 14 years of the CIO-100 awards, we've rarely duplicated a theme. We've covered quality, global business, customer service, value chains and more. This is the second time we've explored innovation.

Why innovation, and why now? Haven't we had enough innovation during the past few years with the Internet boom—and look where it got us! Isn't it time to get back to basics?

According to the executives and pundits in this issue, innovation *is* a basic. And what happened during the past few years was not just innovation; there was a fair dose of "insane delusion," says Michael Schrage in "How Things Change," on Page 116. "There's something wrong with not testing innovation metrics against common sense."

This year's issue profiles companies that are committed to innovation of all kinds. Some are product innovators; some have changed the terms of competition by innovating new processes; others are breaking new ground in the relationships they've forged. We celebrate their excellence and share with you the secrets of their success.

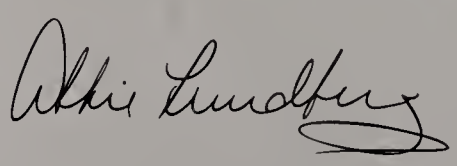
The CIO-100 is one of our most ambitious projects. Departments Editor Sandy Kendall led this issue from start to finish. To prepare for the assignment, Sandy read stacks of books and papers, attended conferences and talked to everyone who is anyone in the study of innovation. Armed with this knowledge (and with the generous input of Rick Swanborg, president of ICEX and a longtime supporter of *CIO*), she created the application criteria and led the evaluation of over 1,000 applicants. She wrote the overview article, "Innovation Generation" on Page 52, and interviewed Schrage, Gary Hamel and the other thought leaders in this issue. Her dedication is evident on every page.

I'm sure Sandy would agree that she couldn't have done all this without the support of two people—Special Projects Editor Mindy Blodgett, who steers all of our awards programs and projects, and Special Projects Assistant Cristina Sousa, whose genius for detail is matched only by her passion for quality and excellent customer service.

Design-wise, this issue is smart, clean and easily navigable, thanks to Associate Art Director Owen Edwards, who led the design team and created the overall look and feel with enthusiasm and a singleness of purpose that was a wonder to behold.

While the editorial team wrapped up its work in July, the fun culminates on Aug. 12 to 14 at the CIO-100 Symposium at the Hotel del Coronado in San Diego, where honorees will gather to hear from such original thinkers as Paul Saffo, John Seely Brown and Geoffrey Moore, network with each other and be feted at our gala awards ceremony.

We know not everyone can join us for these face-to-face events, and we also know that meeting and sharing experiences with your fellow CIOs is your most highly valued opportunity for learning. So a few months ago, we created the CIO Best Practice Exchange—a secure, members-only, moderated online forum in which a select group of IT executives exchange best practices on everything from choosing a vendor to IT value to ERP. The best part of the exchange is that no vendors or consultants are allowed! If you'd like information on becoming a member, e-mail Martha Heller, director of the exchange, at *mheller@cio.com*.



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InBox

Reader Feedback

Opinion

CIO Confidential
Anonymous 172
Reality Bytes
Amelia Carnuta 178
Insights
Jeff Panko 182
From the Publisher
Gary Beach 184

CIO Confidential
Only the Names Have Been Changed

Cogs in the Machine

BY ANONYMOUS

"Mister Thrower's joined the woods and happy with her full three feet."
—Primitive Radio Gods

A COMPANY I USED TO work for recently announced it was laying off thousands of people from an assortment of departments in its headquarters, including a few hundred from the IT department, and more from plants and various other facilities around the world. The local news programs ran footage of employees carrying boxes of their personal belongings through the parking lot, some stumbling to answer cool tearful interviews. When one husband and wife (both of whom had been laid off) were asked by a reporter how they felt, I had to turn the television off.

My dad spent most of his years working in aerospace, a heavily unionized, extremely inefficient industry that is no stranger to layoffs. The cycles of war and peace, combined with arcane and inflexible work rules forbidding personnel reassignment or the restructuring of responsibilities, made periodic layoffs a fact of life. Few of the large companies that are currently downsizing, particularly those in high-tech, have unions of any kind. (See "IT Workers of the World Are

LAYOFFS: WHO IS TO BLAME?

The "blame senior management" angle is old, not to mention intellectually lazy ["Cogs in the Machine," CIO Confidential, May 1, 2001]. If the ever was an application for chaos theory, human capital management is right up there. There are so many variables with which to contend that I submit it's beyond the ability of any team of people—management or otherwise—to configure for lifetime employment.

Ultimately, it is your responsibility to ensure that you can do something for which someone else will exchange money, goods or services. And while it may not be your fault when the layoff notice comes, it is your fault if you spend an exorbitant amount of time agonizing about what might have been.

There is no protection available—not from management, not from labor unions, not from government. But because no one—especially in this country—is allowed to fail, someone else must be to blame for all of life's challenges. Oddly enough, management is never called to task for hiring people, only when it lets them go.

James D. Howe • *Chief Technology Officer* • *Usertech* • *East Norwalk, Conn.* • *howe@usertech.com*

I found your critique of upper management and the layoff process interesting. I agree with you that in many cases layoffs could be avoided without any net cost to the company. In most cases, the company could benefit by retaining its employees and making better use of them. As you point out, that could be more difficult if unions are involved. The primary tools that are needed to avoid layoffs are foresight and planning.

Over the years I have coached youth sports. One of the lessons I learned is that you can always find a place for someone, as long as they really want to play. Management's role is to help employees figure out the best way for them to contribute, then to provide opportunities. In organizations in which that happens, great things can be accomplished.

As a manager at a public university, my situation is somewhat similar to that of a youth sports coach. Layoffs are not usually required because of external factors. Termination is not usually an option unless circumstances are dramatic.

Bob Dignan
Director of Fiscal Services
California Polytechnic State University
San Luis Obispo, Calif.
bdignan@calpoly.edu

I was laid off in January, along with 11 other employees, when my previous employer closed our consulting practice. We did high-end IT management consulting, but they've since laid off 100 additional employees in sales and administration. Politics and management mistakes forced the layoffs, but the stockholders will never know that. We had hundreds of thousands of dollars of business booked and ready to deliver, which the company never saw because we were laid off. And several clients said they would not renew other work with the company because they could no longer trust that the company would deliver.

I figure that we lost our jobs because some clerks could not invoice clients correctly, and management ignored the problem until it was too late. One client asked me for his $59,000 invoice last year so that he could get it paid in his fiscal year—and the clerks sent him a bill for $250,000. They said they'd send the correct one. The next bill was for $50,000—the wrong amount. More than six months later, the clerks still had not issued a correct invoice. If this was one simple project of many in the company, I'm surprised my paychecks didn't bounce each week.

But what's $10 million or $20 million anyhow? It's my job and the jobs of my coworkers.

What a mess. My biggest frustration? Watching all this happening and raising red flags while management drives the company into the ground.

Phil Perkins
Principal
Virtual Process Consulting
Boston
cio@virtualprocess.com

This is one of the best articles I've read that addresses the real reasons we are experiencing a record number of layoffs. Just recently, I was affected by a

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second restructuring in my company (a leading provider of enterprisewide solutions for employee relationship management). One of the first questions I addressed to the divisional executive vice president in charge of coordinating my severance was, "How many members of our senior management team were affected by this most recent event?" Needless to say, the question left him flustered and grasping for a politically correct response.

Mary O'Connor-Shaver
Administrative Coordinator
Deloitte & Touche
Columbus, Ohio
moconnorshaver@deloitte.com

Thank you for that excellent and perceptively written article. I have recently seen many articles on the subject of layoffs.

I love the analogy to secret societies, because that is precisely how too many of the C-levels regard themselves, and it is how they tend to run the operation's show. As an older-than-40 female manager, I have constantly had to butt heads (diplomatically, of course) with younger male egos who have attained positions of leadership and ownership.

Good business plans? What a concept. I was recently laid off from a company that, as it turns out, was sliding downhill even before I joined last year. It was not the typical dotcom, because it had a parent holding company that held about a dozen other companies. The parent company stock had been robust and sound for quite a few years, and it had been in business for more than a dozen years. The problem was, it had made dough from using employees recruited oversees in a manner similar to the indentured servant system.

Before I joined the company, I was concerned about the potential for abuse of Third World employees and also for perhaps a certain level of discrimination toward the citizens here. But I did not learn the level of how discouraging the practice of underpaying, overworking and flagrant lying about employee laws was until I became more familiar and acquainted with my colleagues from across the sea and had witnessed firsthand some of the more insidious levels of disrespect that the upper management and owners had for anyone not in the in-crowd.

I am glad to see that you did offer some consolation to the recently laid-off folks with an appeasement that it wasn't their fault.

It is especially harder for my younger colleagues. They seem to take their first big loss harder on the chin, while dogs like myself pretty much roll with the punches and move on.

Anonymous
Private Consultant
Pittsburgh

Thank you for writing this article. It eloquently states what I have thought for several years. My "termination because of economic reasons" occurred six months ago, and I am starting month seven of a job search. Here in the metro-Phoenix area, there are thousands of employees on the streets. Freedom to move and do something new is a nice optimistic phrase, but it doesn't pay the bills. It is disheartening to hear of the millions in bonuses paid to people like the ex-CFO of Lucent who screwed up so badly in the short time she was there. People in the circumstances above don't spend time at a pity party because they cannot afford to. Those millions paid to the ex-CFO could be survival funds for a lot of folks.

And those left behind as layoff survivors are wondering when the other shoe will drop. Will their company ever return—or is all the loyalty, pride, commitment and joy of working there gone forever?

Anonymous

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Send your thoughts and feedback to *letters@cio.com*. Letters may be edited for length or clarity.

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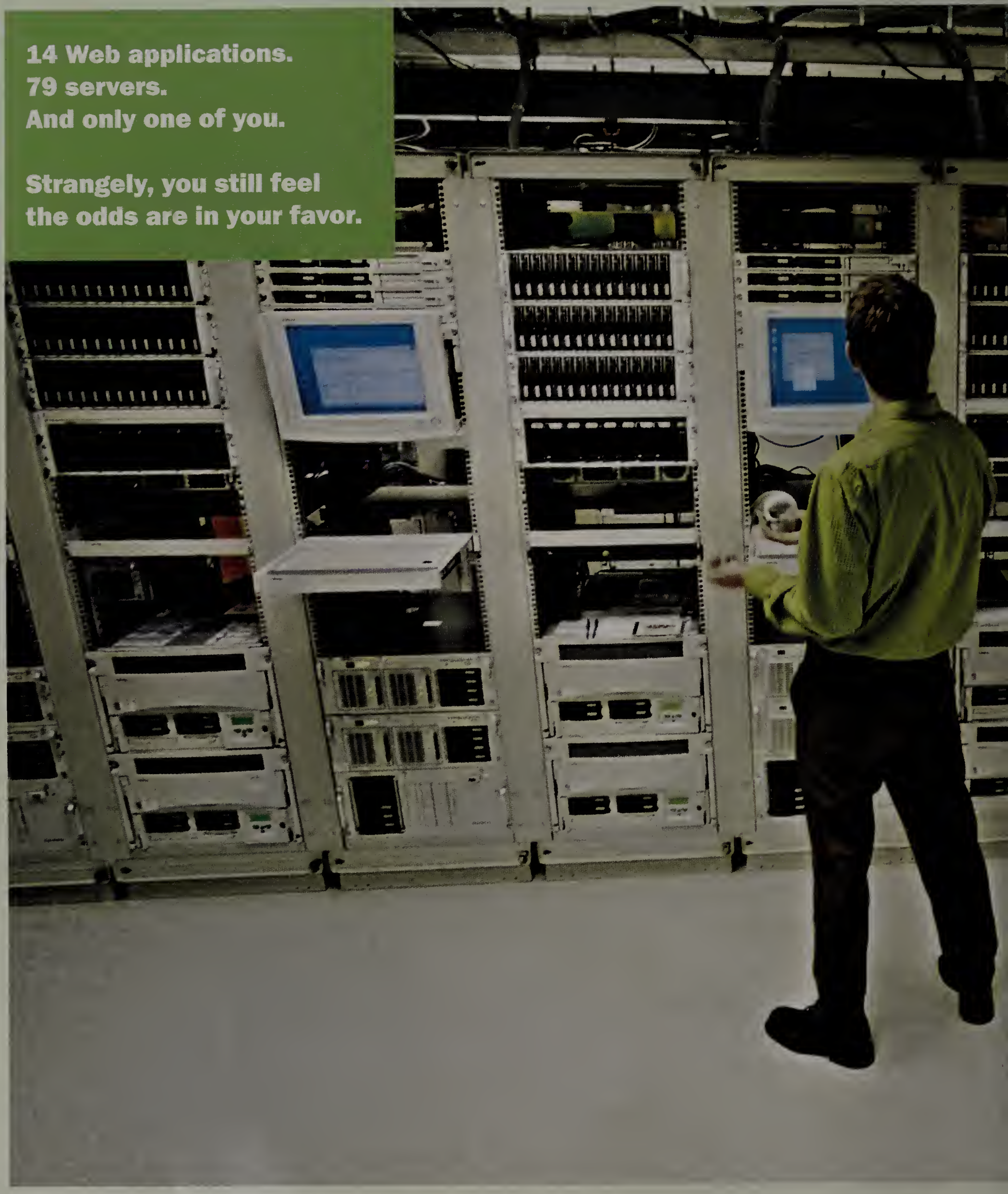

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Microsoft Application Center 2000

Web server farms have always been known for providing high application availability in a cost-efficient manner. Unfortunately, in the past they have also been known for manageability headaches. But no more: Microsoft Application Center 2000 now makes managing Web applications and groups of Web servers as simple as managing a single server.

Part of the flexible Microsoft .NET Enterprise Server family, Application Center 2000 is built to be the heart of a "scale-out" infrastructure model. "Scaling out" is a flexible approach to scalability that involves deploying Web applications across multiple servers to distribute and handle the workload.

Application Center 2000 makes scaling out easier, with unified Web application and server-farm management that simplifies tasks like cluster management and application deployment. Plus, it makes it easy to achieve capacity on demand through automatic replication of applications when you add servers or make changes to existing applications. But simplicity is not all you get: Application Center 2000 offers increased uptime through dynamic load balancing and by having no single point of failure.

MARKET FACT

"The scalability benefits offered by Application Center made it possible to migrate to a distributed Windows platform. Application Center gives us on-demand scalability and is a powerful tool for managing Windows 2000 based Web server farms."
–Mike Bodnar, Production Services Manager, Terra Lycos

In sum, Application Center 2000 removes the hassle of managing multiple servers separately, while providing the availability and cost-efficiency of a "scale-out" model. Find out how to keep the odds in your favor: visit **microsoft.com/applicationcenter** Software for the Agile Business.

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trendlines

the NEW the HOT the UNEXPECTED

Edited by Sara Shay

TIME MANAGEMENT

And the Beats Go On

By Susannah Patton

DOES ANYONE REALLY know what time it is? If you believe the folks at CIO-100 honoree The Swatch Group, it doesn't really matter whether you're in New Delhi, Paris or Timbuktu—it's always Internet time. This Swatch-invented time measurement without geographical borders or time zones is measured in 1,000 "beats" per day, with each beat lasting one minute, 26.4 seconds. Beat 000 falls at conventional midnight in Biel, Switzerland, where Swatch's headquarters is located and the town in which Nicholas Negroponte, the director of MIT's Media Lab, helped the watchmaker inaugurate the system in October 1998. Although Swatch could not provide statistics on how popular Internet time has become, the company says the importance of the new measurement is growing steadily as more people get online around the world. To capitalize on the new time measurement, Swatch launched a line of watches that allows people to keep track of beats as well as good old fashioned hours and minutes.

ILLUSTRATION BY VIOLET LEMAY

These days, however, as pink slips pile up at failing dotcoms, many would like to forget Internet time altogether. And a concept like time is hard to change, especially since the system of time zones has been in place since the 1880s. Still, Swatch believes its Internet time will outlive the dotcom blues and take its place right beside Greenwich Mean Time and other international standards. "Distance and time zones don't exist on the Internet," says Beatrice Howald, a spokesperson for the watchmaker. "If you are chatting with someone on the Net on the other side of the world, you can make an appointment for 500 beats, and there will be no confusion. The importance of Internet time is growing along with the Internet community."

Department of BIG, Scary Numbers

Less than 1: percent of U.S. adults who prefer to worship online rather than in traditional physical locations

8: percent of U.S. adults whose religious or spiritual lives involve the Internet

10: estimated percentage of the U.S. population who by the end of this decade will rely on the Internet for their entire religious experience

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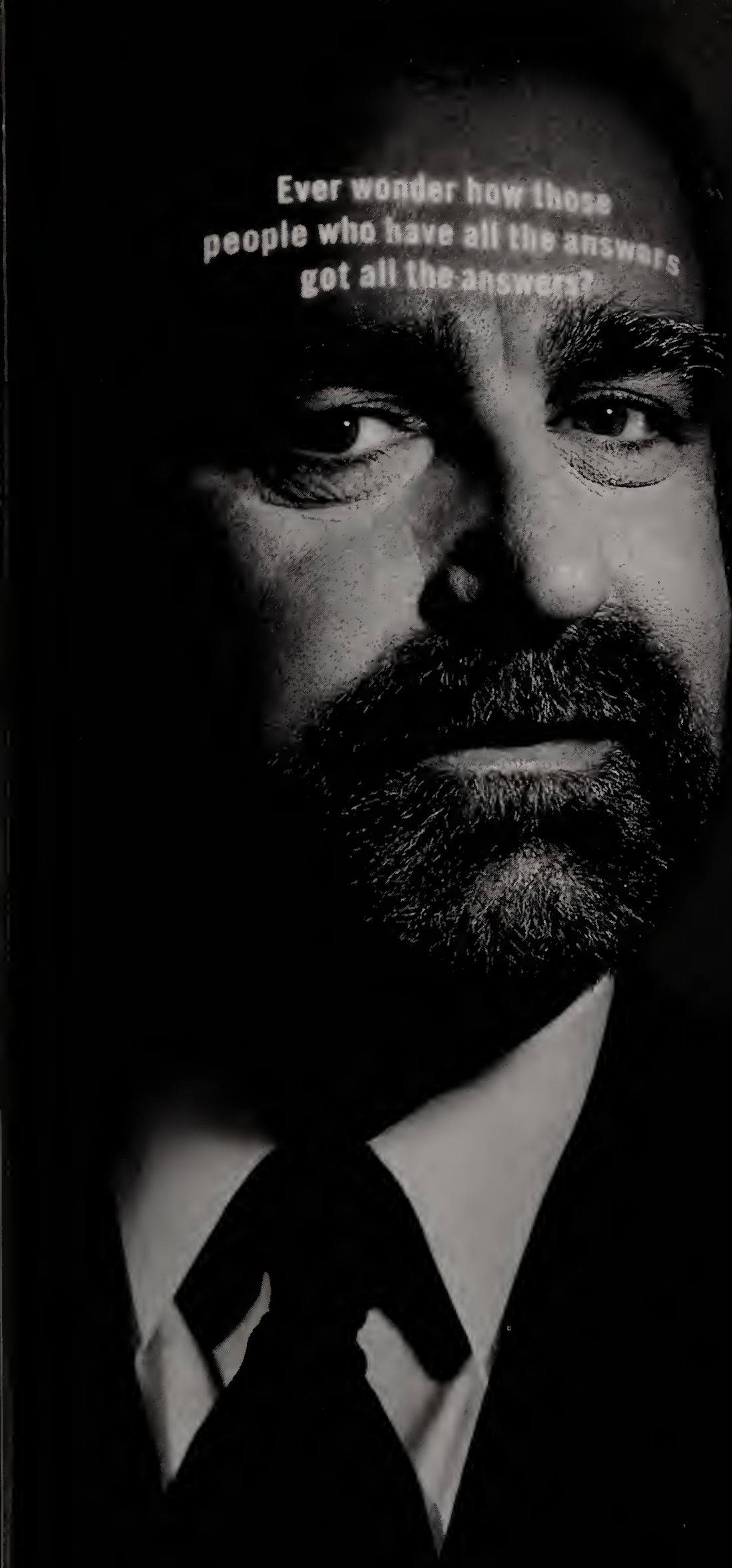

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INTERNATIONAL BUSINESS

Talk Soup

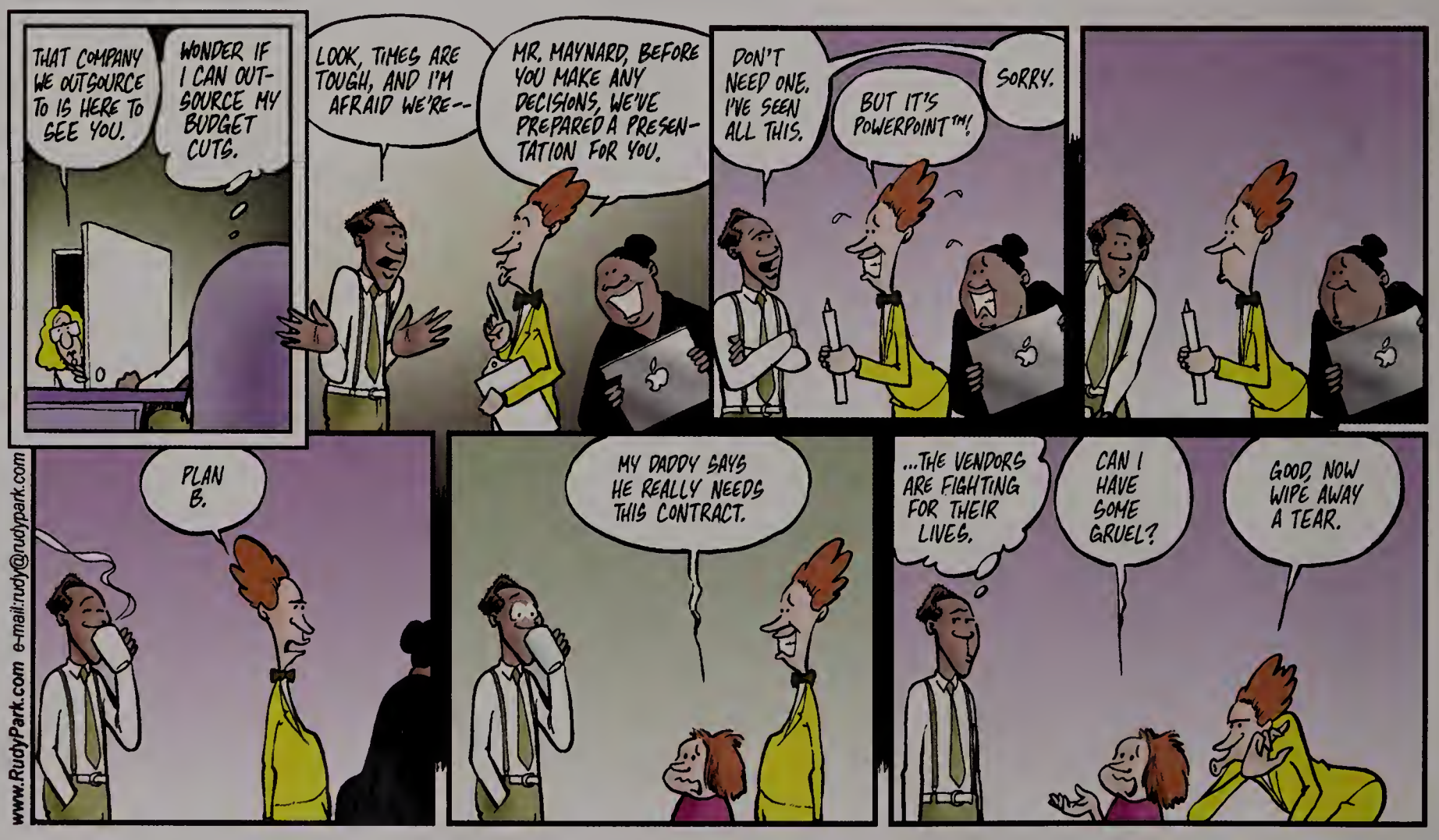
By Stephanie Viscasillas

MORE THAN 100 million people whose first language is not English will be going online every year for the next 10 years or longer. Do you know how to talk to them? Transclick does. The New York City-based ASP, a CIO-100 honoree, allows a unified messaging system, e-CRM unit, e-mail system, Web server or cross-border B2B supply chain to access real-time translation services. Using the service, you can type an instant message in English to your Japanese-speaking business partner, which she receives in Japanese. Then she responds to you in Japanese, and the response comes to you in English.

There are three quality choices, according to Robert Levin, founder and CEO of Transclick. The first is raw machine quality, which is similar to what you'd get on a translation website like BabelFish. The second level offers customized dictionaries specific to certain markets, providing a more accurate translation than the first option. The nouns are also context-specific, so you could use the word *cool*, and it would know the difference between something chilly and something interesting. The final level is integrating translation memory, which is 100 percent accurate. These are based on previous human translations that are stored in an Oracle database.

Transclick has an $820,000 grant from the U.S. Army Research Laboratory to study the future of speech-to-speech translation in mobile devices, which could be applied to voice mobil-commerce portals. Down the road that will allow someone speaking English to be understood in Spanish over Internet telephony or a cell phone. "It's like when Spock is communicating with the Klingons in *Star Trek*," Levin explains. "When he spoke English, they heard Klingon."

Maynard BY DARRIN BELL AND THERON HEIR



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Washington Watch

Edited by Elana Varon

Taxing Questions

Already forgotten about those PCs you replaced last month? Your CFO hasn't. Thanks to a 15-year-old law that requires companies to depreciate computer equipment over five years, your company will be expensing those obsolete computers for three more years.

The IT industry has been fighting for shorter depreciation periods since nearly the advent of computers, says **Bartlett Cleland**, vice president and counsel of the Software Division of the Information Technology Association of America, an IT trade organization in Arlington, Va. It's important for companies because claiming obsolete assets can inhibit their ability to attract investors, says **Michael Erbschloe**, vice president of research at Computer Economics, a Carlsbad, Calif.-based technology market research company. Also, with a shorter depreciation period, a company would write off equipment once it lost its value and be able to spend more on new equipment, he says.

Success has been elusive because policy makers figure it's too expensive—although no one in Congress nor several tax experts we asked could tell us how much revenue the government would lose if the rules were changed. Gina Carty, a spokesperson for **Sen. Conrad Burns** (R-Mont.), who supports shorter depreciation periods for IT equipment, says that in this year's tax cut bill, provisions like eliminating the marriage penalty were a higher priority.

But there are still bills in play to change the depreciation rules, including one sponsored by Burns and another by **Rep. Jerry Weller** (R-Ill.). **Rep. Mac Collins** (R-Ga.) proposed a complementary bill in May that would reduce the depreciation period for computers used to run manufacturing machinery.

Jerry Weller

Mac Collins

Now for the bad news: It's unlikely the bills will pass this year. Carty says that if companies want to see them move forward, they'll have to lobby for them. Meanwhile, Weller has hit upon another strategy. His spokesperson, Ben Fallon, says the House could attach the depreciation bill to a pending minimum wage increase as compensation for requiring companies to increase employee pay. *–Lauren Capotosto*

Online Border Patrol

The Internet has been credited with breaking down international boundaries. But when cybercrimes hit internationally, the perpetrators run for the friendliest border. Hacking isn't illegal in every country, and there's no treaty that requires foreign law enforcement officials to help hunt down and prosecute cybercriminals who launch their attacks from within their nation's borders.

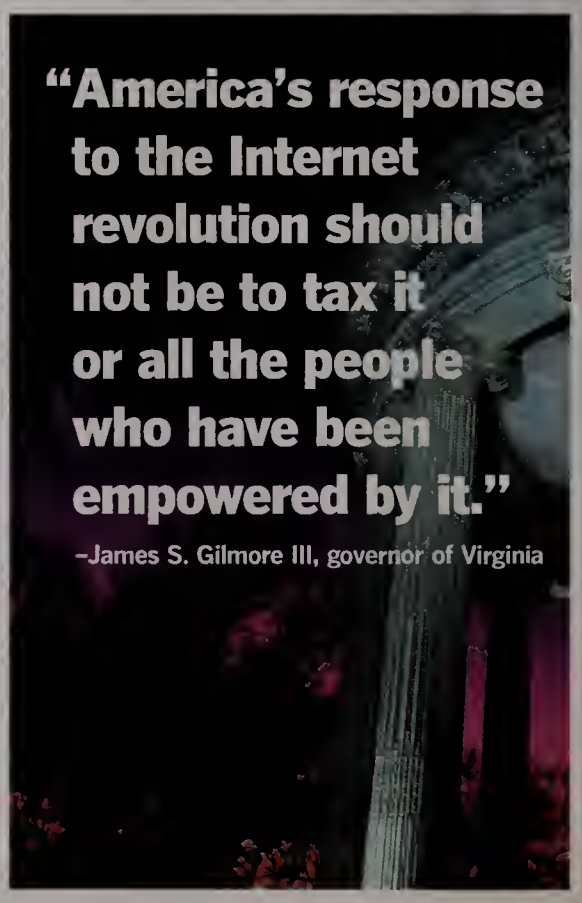
The Council of Europe, with lots of input from the United States, has drafted a treaty that promotes international collaboration to fight cybercrime. The treaty would make crimes such as denial-of-service attacks illegal in all signing countries.

Europe's Committee of Ministers, the decision-making group within the Council of Europe, is expected to approve the treaty in November, after which signatories like the United States will have to ratify it for it to take effect. The U.S. Senate, which must ratify all international agreements, doesn't have any plans yet to take up the treaty, though Chip Unruh, spokesman for **Sen. Joseph Biden** (D-Del.), who heads the Senate Foreign Relations Committee, says the panel could discuss it this fall.

The United States needs to ratify the treaty to get help from at least 40 other countries to prosecute cybercriminals, says **Martha Stansell-Gamm**, chief of the Computer Crime and Intellectual Property section of the Department of Justice.

While no one disputes the goal of the treaty, security experts and privacy groups have problems with it. The treaty would criminalize "white hat" hacking into company networks to test for security holes, says **Elias Levy**, CTO at SecurityFocus, a San Mateo, Calif., security services company. Meanwhile, **David Banisar**, deputy director of Privacy International in London, argues the treaty sets broad standards for data capture by law enforcement but no parameters for what data investigators can collect.

–L. Capotosto



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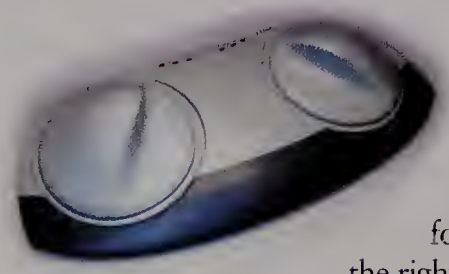
HARDWARE

One Keyboard, Hold the Keys

By Stephanie Overby



MYTH HAS IT THAT typewriter inventor Christopher Latham Sholes' first machines were so clunky, he used the qwerty layout to slow typists down and keep the hammers from jamming. True or not, the fact is that the layout of the key-driven data entry device has remained mostly impervious to innovation since the first Sholes-designed Remington was sold in 1874.

Now one company has patented the first alphanumeric "keyless" keyboard. CIO-100 honoree Keybowl of Winter Park, Fla., has introduced the ergonomic OrbiTouch, which uses two domes that move laterally across what looks like a normal keyboard base, sans keys. Typists use their hands and arms, rather than fingers and wrists, to create a keystroke by sliding the domes into one of eight positions.

Using OrbiTouch takes practice, although the company has tried to model dome movements after qwerty hand motions. To type the letter "n" for example, you slide the left dome to the south and the right southwest.

Keybowl says OrbiTouch allows people with carpal tunnel syndrome or other upper extremity disabilities to type faster than they could with traditional keyboards. OrbiTouch may also be useful for older adults who suffer from arthritis, according to Peter J. McAlindon, Keybowl's president and CEO.

OrbiTouch is PC-compatible (a Mac version is in the works) and comes with a choice of large or small domes. But it isn't cheap—$399, available only at *www.keybowl.com*.

PARTNERSHIPS

A Good Working Relationship

PHOTO BELOW BY DAN PEARCE; PHOTO TOP COURTESY OF KEYBOWL

LYNN AND DOUG CADDELL will celebrate their silver anniversary this fall, but they still talk like newlyweds. Highly technical newlyweds. Both husband and wife are CIOs whose respective companies are 2001 CIO-100 honorees. They spend weekdays apart: Doug works in the Milwaukee office of Brussels, Belgium-based law firm Foley & Lardner. Lynn works three miles from home at Yellow Technologies, which provides IT services to Yellow Freight System in Overland Park, Kan. *CIO* asked them what role their similar career paths play in their lives.

Do you discuss work at home?

Lynn: We keep work talk to a minimum. This is time dedicated to [our three] boys. We do discuss situations we are facing, but they typically deal with management, processes or people issues.

How do you manage living apart during the week?

Doug: Technology helps in this situation—between cell phones and e-mail we are always in touch.

Lynn: It works for us. It's not for everyone. I think you have to be fairly secure in your relationship. We try not to do work on the weekends. We make time for the boys.

Doug: Weekends are sacred.

Do you think having the same position helps your marriage?

Doug: While our organizations are very different—Lynn's being a Fortune 500 corporation and mine being a closely held law firm—we understand the details and underlying issues that the other faces. We understand why one of us is having a bad day. The elementary shop-talk is eliminated, and only the really interesting items or serious challenges are discussed.

So working in different industries also helps?

Lynn: I think the difference is the size and scope. When you're with a Fortune 500 you have a bigger staff, variety, so what we do is different enough...

Doug: ...that we're not competing with each other.

Lynn, what attracted you to Doug?

Lynn: Because he was in the Navy he was more mature, although he's the same age as me. I looked for people with a little more depth and personality. You can thank me later, Honey.

How old are you?

Doug: [laughing] I'm 28, she's 29.... No, we're both 47, but I'm older by a month.

Lynn: And wiser by a month.

Doug: You're the better looking one.

–Sarah Johnson

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Schedule-at-a-Glance

PRE-CONFERENCE

September 10

9:00 a.m.–5:00 p.m. Wireless Data University
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9:00 a.m.–6:00 p.m. WirelessDevNet.com TechDay
Sponsored by The Wireless Developer Network

September 11-13 Federal Wireless User Forum [FWUF]

DAY ONE

Tuesday, September 11

9:45 a.m.–11:00 a.m. Keynote
11:30 a.m.–1:00 p.m. Panel Sessions [4 Tracks]
2:30 p.m.–4:00 p.m. Panel Sessions [4 Tracks]
5:00 p.m.–10:00 p.m. T3 Wireless—eXtreme San Diego

DAY TWO

Wednesday, September 12

9:45 a.m.–11:00 a.m. Keynote
11:00 a.m.–6:00 p.m. Exhibits
11:30 a.m.–1:00 p.m. Panel Sessions [4 Tracks]
1:30 p.m.–2:30 p.m. Coffee & Cookies on Show Floor
2:30 p.m.–4:00 p.m. Panel Sessions [4 Tracks]
4:00 p.m.–6:00 p.m. Exhibit Hall Cocktail Reception

DAY THREE

Thursday, September 13

9:45 a.m.–11:00 a.m. Keynote
11:00 a.m.–5:00 p.m. Exhibits
11:00 a.m.–3:00 p.m. Oppenheimer Smart Pass
11:30 a.m.–1:00 p.m. Panel Sessions [4 Tracks]
1:30 p.m.–2:30 p.m. Ice Cream Break on Show Floor

Parties & Receptions

September 11

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T3 WIRELESS

September 12

Exhibit Hall Cocktail Reception—the official networking event on the night of the Exhibit Hall's opening.

September 12 & 13

Ice Cream & Cookie Breaks on the Show Floor—designed to facilitate networking so that you gain the important contacts you need!

Educational Tracks

CTIA WIRELESS I.T. & INTERNET 2001 will feature four program tracks catering to the needs of IT managers tasked with servicing the company's bottom line. From case studies of real world solutions that are saving companies thousands of dollars today, to the nuts and bolts of rolling out wireless data solutions, to ways to service your customers on their wireless devices. The **CTIA WIRELESS I.T. & INTERNET 2001** show content will provide you with a ready answer to your boss's most pressing question: What has IT done for me lately?

Day One: Tuesday, September 11, 2001

11:30 a.m. – 1:00 p.m.

Track II:
The Mobile Workforce
Building Enterprise Solutions
Room 32A

From content source to middleware to the wireless interface to the end user device, the provider chain of wireless enterprise applications is long and can be very confusing. Industry experts will be on hand to explain each company's responsibility and the product or service it will provide.

Moderator: **Jeff Ross,** Director, Business Development, Wireless Knowledge, Inc.
Andrew Harries, VP, Corporate Development & Co-Founder, Sierra Wireless
Diana Ingram, VP, Sales, Global Wireless Solutions, IBM *(invited)*
Prakash Iyer, CTO & Co-founder, Everypath
David Marutiak, Business Development Manager, Microsoft
Tracy Trent, CEO, President, Stellcom

Track II:
The Mobile Workforce
Security Room 30D

One of a company's greatest assets is its intellectual property. As such, giving wireless access to even an e-mail address list must have the highest level of security precautions in place before an I.T. manager will agree to look at a wireless solution. While security remains a high-profile issue in the media, and rightly so, attendees of this panel will see the large steps that have been taken to meet security concerns.

Philippe Benitez, Manager, Field Marketing Mobile Communications, Schlumberger
Gail Hamilton, Senior VP, Symantec
Verne Meredith, VP, Sales & Marketing, Diversinet Corporation
David Potts, OMAP Processor, Worldwide Applications Manager, Texas Instruments
Barry Shelton, VP, Operations, Wireless Knowledge, Inc.

Track III:
The Wireless Marketplace
Content Creation, Repurposing and Transcoding Room 31B

There's a wealth of useful content available today to which companies want to provide wireless access. But just shoving Internet content down wireless pipes is not the answer. Learn the how, why and wherefore of creating new content, repurposing old content and transcoding various languages to successfully enhance your existing information resources.

Moderator: **Tom Trineer,** VP, Portal Development, AT&T Wireless Services
Hassan Alam, CEO & Chief Scientist, WiredPocket
Keith Bigelow, Director, Product Management, Lutris Technologies
Richard Ling, Co-founder, CEO & President, AlterEgo
Rick Robinson, VP, Mobile Services, AOL *(invited)*
Jake Sullivan, VP, Engineering, 2Roam

Track IV:
Meeting the Market
Monetizing the Customer
Room 33B

From wireless CRM applications to reducing churn to maximizing customer information, this panel looks at the many complicated factors surrounding a carrier's relationship with its customer. It asks both what your customer can do for you, as well as what you can do for your customer.

Moderator: **Susan Furnell,** Director, US Infocoms Practice, Roland Berger Strategy Consulting
James Green, CEO, GiantBear, Inc.
Joseph Laszlo, Senior Analyst, Jupiter Media Metrix
John Little, CEO & Founder, Portal Software
Bruce Rowland, Senior Manager, Wireless Internet Laboratory, Lucent Technologies
E.Y. Snowden, President & CEO, BCGI

2:30 p.m. – 4:00 p.m.

Track IV:
Meeting the Market
Working with the Government Room 32A

Providing wireless and wireless I.T. services to government agencies represents a quickly emerging new market of great potential. However, service providers must wade through a maze of rules, regulations and laws in order to access this lucrative space. Also, government needs can be unique as well. This session will feature representatives of several government agencies clearing out the clutter to make working with the government much easier going forward.

Moderator: **Ed Gray,** Partner, Fitch Even Tabin & Flannery
Mary Brooner, Director, Telecom Strategy & Regulation, Motorola
George Chandler, Director, San Diego District, U.S. Small Business Administration *(invited)*
Joe Gattuso, NTIA, Wireless Innovations in Communications Initiative *(invited)*
Elizabeth Lyle, Wallman Strategic Consultants *(invited)*

Track II:
The Mobile Workforce
PANs, LANs and WANs
Room 30D

Bluetooth, 802.11, wireless Ethernet, VPNs. Wireless networks are getting smaller and smaller but their need to connect with public wireless networks is getting larger and larger. With WLAN networks becoming more pervasive, what opportunity do they provide to the enterprise? What kind of sharing and integration will there be between them? Representatives from all types of networks and technologies will be on hand to answer those questions and others.

Moderator: **Ed Evans,** President & COO, Dobson Cellular Systems
John Drewry, Senior Director, Business Development, 3Com
Lara Kahler, Mobile Wireless Director, Hewlett-Packard
Deepak Mehrotra, President & CEO, GTRAN Wireless
Larry Mittag, VP, Chief Technologist, Stellcom
Tom Sweeney, President & CEO, Classwave Wireless Inc.

Track III:
The Wireless Marketplace
Mobile Transactions
Room 31B

While communication remains the primary function of wireless and wireless Internet services, today's services also represent a significant new channel for retailers to reach consumers. But there are many issues related to wireless payment systems that require addressing. Security, authentication, privacy and revenue sharing all come into play.

Moderator: **Morwenna Marshall,** Editor-in-Chief/Editorial Director, *M-Business Magazine*
Jean-Louis Carrara, Director, Telecommunications, North America, Gemplus
Joe Chouinard, VP, E-commerce, Visa International
Kristopher Cone, Director, Business Development, AT&T Wireless Services
Tom Erskine, VP, Product Development, BCGI
David Z. Press, Chief Solutions Strategist, ALLTEL Information Services

Track IV:
Meeting the Market
3G: Fact or Fiction
Room 33B

The term 3G has been thrown around so much that it has become a cliché ... but its definition changes almost daily. Additionally, expectations for the technology have been altered over the past year as well. This panel provides an opportunity for all involved to review the 3G-evolution to date and paint a new picture for next generation services and technology.

Moderator: **Judith Lockwood Purcell,** Editorial Director, *Wireless Week*
Rich Berliner, President & CEO, Berliner Communications
Dr. Chuck Brown, 3G Marketing Manager, Intel Corporation
Roger Deeringer, CDMA Data Offer Marketing Manager, Lucent Technologies
Tom Faulders, Chariman & CEO, LCC International, Inc
Dr. Nitin Shah, Executive VP, Internet Products Division, ArrayComm
NTT DoCoMo – Speaker TBD *(invited)*

Day Two: Wednesday, September 12, 2001

11:30 a.m. – 1:00 p.m.

Track I:
Solutions: Here and Now
The Early Adopters
Room 32A

By quickly recognizing the value of wireless convergence, early adopters in various vertical and other industries have pioneered the integration of wireless access to corporate data. Their case studies outlining the challenges and successes of their historical experiences can serve as a roadmap for those who follow.

Moderator: **Antony Bruno,** Assistant VP, Wireless Internet Development, CTIA
Lewis Blumstein, VP, Distributions & Solutions Program, Cingular Interactive
Frank Brilliant, VP, Business Solutions Group, Arch Wireless, Inc.
Mike Fabbri, VP, Corporate Sales, Motient
Paul Jacobs, Executive VP, QUALCOMM
John Shepley, VP, Aether Systems, Inc.

Track II:
The Mobile Workforce
Cost vs. ROI Room 30D

Convincing an enterprise to adopt wireless solutions has never been easy. With tight times upon us, the job of justifying wireless enterprise applications is just that much more difficult. This session deals frankly with the real-life cost of implementing wireless solutions to the enterprise while at the same time outlining the return on investment that they provide, both in added employee efficiencies and cost reductions.

Moderator: **Richard Siber,** Associate Partner, Accenture
Bill Davidson, VP, Wireless Strategy, Aether Systems
Jay Highley, VP, Business Marketing, Sprint
Mark Lundstrom, President & CEO, Ripcord Systems *(invited)*
Bill Nguyen, President, Founder & Chairman of the Board, SEVEN
Kristopher Tyra, CTO, Hiddenmind

Track III:
The Wireless Marketplace
Mobile Advertising & Marketing Room 31B

Never before has there been an opportunity to reach consumers through such direct and personal means. Done properly, wireless advertising and marketing could be elevated to the status of a service, and no longer a necessary irritation in return for free content. On hand will be visionaries of this new field discussing the strategies to make this happen.

Moderator: **Andy Fessel,** VP, Wireless Intelligence, Telephia, Inc.
Charles Gerlach, Director, Mainspring, Inc.
Gannon Giguiere, Senior Director, Global Product Marketing, AltaVista
Sean Harrison, President, WindWire
Daren Tsui, CEO, SkyGo

Track IV:
Meeting the Market
Partnerships and Alliances
Room 33B

The wireless industry is perhaps one of the most fiercely competitive businesses. But for wireless data solutions to work, most agree that competitors will have to work together. The opportunity in wireless data and wireless Internet adds an increased level of complication to the value chain and business models. Hear as those who practice a partnership strategy discuss how to better team with the others in the wireless data space.

Moderator: **Brad Silverberg,** Partner & CEO, Ignition
Mike Dolbec, Senior VP, Business Development, OmniSky Corporation
Adam Guy, Senior Analyst, Mobile Wireless Research, The Strategis Group
Louis Judice, Director, HP Mobile e-Services Bazaar, Americas, Hewlett-Packard
Mark Thomas, VP, Business Development, Geoworks Corporation

2:30 p.m. – 4:00 p.m.

Track I:
Solutions: Here and Now
The New Innovators
Room 32A

It's been said that the killer app of wireless data hasn't been invented yet, but it's not for lack of trying. The possibilities for productivity increases and other benefits offered by the convergence of wireless, computers, and the Internet is endless. This panel examines some of the newest and most innovative uses of those converging technologies and offers a view to the potential road ahead.

Moderator: **Mark Desautels,** VP, Wireless Internet Development, CTIA
Benjamin Hill, Director, Technology & Communications Strategy, Sapient
Dan Jester, VP, Business Development, Aeris
John Mennel, VP, Platform Products, 724 Solutions
Jason Rossback, Senior Systems Engineer, Extended Systems

Track III:
The Wireless Marketplace
Privacy Room 30D

This major issue of the Internet and will be an even bigger issue in the wireless Internet. Security systems are available and effective, but there are also many behavioral questions that must be asked by companies offering customers wireless Internet services. To what degree do you offer opt-in services? Push or Pull? Who owns and has rights to usage data and account information about customers? As location-based services advance, these questions will only get more complicated. Now's your chance to begin addressing these issues, and walk away with some answers.

Moderator: **John Windolph,** Senior VP, Business Development, CTIA
Ken Arenson, President, TeleCommunications Systems Inc.
Joe Assenzo, Director, Regulatory Affairs, Sprint PCS
Stacy Feuer, Bureau of Consumer Protection, Federal Trade Commission
Al Gidari, Perkins Cole LLP
Jonas Neihardt, VP, Federal Government Affairs *(invited)*

Track I:
Solutions: Here and Now
Customer Service Solutions
Room 31B

It's been said that customer service is the defining factor in any organization, and today's wireless customer relationship management solutions are revolutionizing the potential of this important field. This session will present a number of case studies outlining resourceful wireless CRM solutions and will demonstrate the effects of those applications on the bottom lines of those companies implementing them.

Moderator: **Brenda Lewis,** Principal, Transaction Marketing Inc.
Speaker TBD – American Airlines
Speaker TBD – Charles Schwab
Speaker TBD – Harte-Hanks

Track II:
The Mobile Workforce
Messaging Room 33B

Unified messaging, instant messaging, voice messaging, text messaging, e-mail – for the busy corporate employee, messaging is central to productivity, and ubiquitous message delivery via wireless has proven to be an effective tool. Find out the power of these applications today and discover where they are going tomorrow.

Moderator: **Becky Diercks,** Director, Wireless Research, Cahners In-Stat Group
Dan Albaum, Manager, Product Management, Cisco Systems, Enterprise Software Communications Business Unit
Eric Doggett, President & CEO, Glenayre Technologies
Mark Lowenstein, Chief Industry Strategist, Informio
Mark McDowell, President & COO, Invertix Corporation
David Werezak, VP, Marketing, Research In Motion

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Day Three: Thursday, September 13, 2001

11:30 a.m. – 1:00 p.m.

Track I:
Solutions: Here and Now
Targeting the Horizontal Market Room 32A

In tight times, corporations tend to hold back on unnecessary spending. In some ways, that could hold back horizontal adoption of wireless data applications. But the efficiencies wireless data applications provide to the enterprise are too valuable for firms to pass up, especially when the bottom line is at stake. This panel looks at the wireless enterprise applications used broadly across companies today and examines their cost versus ROI.

Moderator: **David Sutcliffe,** President & CEO, Sierra Wireless
Howard Beader, Director, mySAP Mobile, SAP
Patrick Glenn, Fourelle Systems
Thomas Koll, CEO, Infowave Software
Mike Maerz, Chairman & CEO, etrieve
Paul Pocialik, Founder & CTO, Noblestar

Track III:
The Wireless Marketplace
Location Room 30D

An update on where location services are today and the opportunities they can provide. Also, take a look at the potential barriers to these revolutionary new services and at what can be done to overcome them.

Moderator: **Tracy Ford,** Associate Publisher & Editor, *RCR Wireless News*
Mark Flolid, Co-founder & Executive VP, Corporate Development, SignalSoft Corporation
BJ Holtgrew, Senior Product Manager, Microsoft Business Tools, Microsoft Corp.
Stewart D. Hutcheson, Senior VP, Wireless Data Development, Leap Wireless
Ronjon Nag, Ph.D., CEO & Co-Founder, Cellmania
Scott Pomerantz, Chairman, President & CEO, GlobalLocate
Louis Stilp, Executive VP & Company Founder, TruePosition, Inc.

Track IV:
Meeting the Market
Wireless Multimedia
Room 31B

This ain't your father's mobile phone! A new generation of handsets is expected to hit the market by storm along with a plethora of new wireless services to support them: streaming video, digital imaging, MP3 audio.

This panel looks at the multimedia opportunities available both now and those on the way to determine how to fit these cutting-edge innovations into the wireless family of products and services.

Moderator: **Kendra VanderMeulen,** Industry Consultant
Sasson Darwish, President, EMBLAZE Systems
Ian Freed, GM, Mobile Products and Services, RealNetworks
Dr. Mike Ritter, CTO, Metricom, Inc.
Robin Nijor, VP, Sales & Marketing, LightSurf

Track III:
The Wireless Marketplace
Application Usability
Room 33B

Good content means little if a user can't get to it. Whether the obstacle is with the user interface, the location

Special Interest Seminars

Monday, September 10

The Wireless Data University

Presented by

WDU
Wireless Data University

Wireless Data University – with another completely updated agenda – is a unique day-long event within the CTIA conference. For six years, WDU has been providing its thousands of attendees with a basic foundation combined with sophisticated analysis about the wireless data industry.

The morning tracks are:

TRACK ONE
The Basics of Wireless Data Communications

TRACK TWO
Stop Cutting Your Own Throat: How to Really Make Money in Wireless Data

TRACK THREE
Wireless Networks, Applications and Services

The afternoon sessions are:

1. Gizmos and Gadgets: What's New in the Way of Wireless Devices?
2. Wireless Entertainment: Even More of a Sure-Fire Moneymaker
3. Wireless Stimulants: BREW and Wireless Java

Monday, September 10

WirelessDevNet.com TechDay

Presented by

wireless DEVNET.COM
"The Wireless Developer Network"

The Wireless Developer Network (WirelessDevNet.com) is proud to present the third installment of its information-packed TechDay seminar series. This technology-focused seminar emphasizes knowledge transfer and application development tools and techniques that are of greatest interest to software developers today. Technically focused sessions moderated by industry leading experts will explore issues facing the mobile developer in various areas.

Topics ranging from mobile Java, Location-Based Services, WAP, mobile commerce, Bluetooth, XML/SOAP, enterprise integration, SMS, and voice applications will be examined by leading companies and developers. Their collective knowledge and lessons learned from building wireless/mobile applications for a variety of vertical industries will be discussed and shared with attendees.

BONUS!

Registration to this seminar also includes a CD-ROM containing developer tools provided by co-hosting and contributing companies, WirelessDevNet tutorials, and all Seminar slides/presentation information.

Thursday, September 13

Oppenheimer Business Valuation & Sale of Business Seminar

Presented by

A.M. OPPENHEIMER INC.

Available Exclusively with the "Smart Pass" Registration Package Only

This how-to seminar gives you the practical tools applicable to sale-of-business or employee stock ownership plan (ESOP) or Internet start-up financing.

You will learn:

- How to determine the true value of your business
- How to "package" your business to make it attractive to a buyer
- How to maximize the future potential of your business
- How to handle confidentiality requirements
- How to structure a sale which results in a favorable tax impact to the owners
- How to negotiate an increase in price on the basis of favorable deal structuring

... plus many other key aspects of the process of valuing, selling and/or improving your business.

Tuesday, Sept. 11 – Thursday, Sept. 13

Federal Wireless Users' Forum (FWUF) Conference

For the first time ever, CTIA will be hosting the FWUF workshop at **CTIA WIRELESS I.T. & INTERNET 2001**.

The Federal Wireless Users' Forum is an association of individual Federal Government wireless users, with participation from state and local government users, commercial wireless service providers and developers. The FWUF holds workshops twice a year to establish a dialogue between government users and the commercial wireless industry on commercial wireless solutions and requirements.

of the content, the structure of the navigation or even the quality of service, there remains much work to do to cross Andrew Seybold's Threshold of Usability.

Moderator: **Alan Reiter,** President, Wireless Internet & Mobile Computing
Edward A. Coleman, VP, Business Development, Idetic, Inc.
Gregg Fiddes, VP, Wireless Enterprise Services, Palm *(invited)*
Timothy Griswold, Managing Director, Wireless Solutions, VeriSign, Inc. *(invited)*
Ron Mandel, Manager Developer Services, Openwave Systems Inc.
John Oyler, President, Telephia *(invited)*

The objectives of the FWUF are:

- To educate Federal Government users about wireless telecommunications
- To identify the telecommunication needs of Federal Government users
- To facilitate information exchange with other users groups, standards organizations, manufacturers and service providers to ensure that Government user needs are met
- To support the interoperability of emerging wireless services and equipment through increased participation in the formulation of Federal policy, support of standardization efforts, and other appropriate activities.

The FWUF workshop will focus primarily on wireless data and will include discussion of:

- Government wireless initiatives
- User wireless pilots/systems
- Commercial wireless services and technology

Exhibitors

See the complete exhibit floor on the following page.
as of 7.2.01

Company	Booth #
@Road, Inc.	274S
3D4W	1812
724 Solutions	244S
Adaptive Info	646
Aeris.net	1220
Aether Systems, Inc.	1112
AirLink Communications	1313
AirPrime	2331
Aligo, Inc.	2238
Allcom Products Corp.	1823
American Roamer	2S22
Anritsu Company	2046
AnyDevice	1347
Aprel	193S
APRIVA	3321
Aptix Corp.	34S
Arch Wireless, Inc.	2321
ArrayComm, Inc.	842
Aspiro, Inc.	2223
Astata	2723
AT&T Wireless Services	1131
Atinav, Inc.	1949
Audiovox Communications Corp.	1021
AU-System	622
axesstel, Inc.	1813
Berkeley Varitronics Systems, Inc.	1231
Bluetooth Pavilion	2630
Boston Communications Group, Inc.	2817
Broadbeam Corp.	1831
BroadCloud	2344
CACI International, Inc.	2213
Cellmania	3019
Centurion Wireless Technologies, Inc.	1830
Certicom VPN Group	1807
Cingular Wireless	931
Classwave Wireless, Inc.	623
Clickmarks, Inc.	1416
CMG Telecom, Inc.	323
Columbitech	3020
Communication Components, Inc.	444
COMPAQ Computer Corp.	1737-8
Conversay	214S
CSI Wireless, Inc.	937
CTIA's World of Wireless Communications	1614
Cytaq, Inc.	18S4
Datawire Communications Network, Inc.	1042
Davinci Technologies, Inc.	1920
ecrio, Inc.	623
EMBLAZE Systems	2620
Enfora, Inc.	339
ESRI	2113
Evolving Systems, Inc.	1819
Extended Systems	837
Fibergrate Composite Structures	S49
Fidelity Investments	1341
Field Force Automation Magazine	12S3
Finpro	1137
Fitch, Even, Tabin & Flannery	1609
Fixed Broadband Pavilion	2731
Flash Networks	639
Fourelle Systems, Inc.	S47
Gemplus	2917
Geneva Technology, Inc.	801
Geographic Data Technology	212S
Geoworks	1031
GiantBear	907
Glenayre	1720
Go America Communications	131S
Gravitate, Inc.	2123
GTRAN, Inc.	1637
HiddenMind Technology, Inc.	2313
Hi-Tech Products	3118
Hughes Software Systems	1706
iBasis	40S
IBM Wireless Solutions	1331
Info Directions, Inc.	1846
InfoMove	2121
Infowave Software	618
Intelligent Compression Technologies, Inc.	342
Interactive Intelligence	224S
Intertec Publishing	2221
IntraNet Solutions	1717
Invertix Corp.	1S31
IPDR.org - Interoperability Pavilion	331
ITS America Trade Association	2943
Jigami	1S39
John Wiley & Sons	1937
JP Mobile	421
Kivera	831
KPMG Consulting	27S1
Kyocera Wireless Corp.	231
L3 Technology, Inc.	1747
LocatioNet	2846
LogicTree Corp.	28S1
Lucent Technologies	1321
Lutris Technologies	439
M7Networks, Inc.	230
MagNetPoint, Inc.	1922
Maxrad, Inc.	2022

Company	Booth #
Mentor Engineering	3046
Meritage Technologies	2013
Metricom, Inc./Ricochet	913
Metrocall, Inc.	2837
Microcell iS, Inc.	617
Microsoft Corp.	717
Mitsumi Electronics Corp.	2320
Mobile Wireless Internet Forum	1612
MobileSys	1929
Mobilize, Inc.	1601
Motient Corp.	2831
Mshift	3023
NARUS, Inc.	3024
National Dispatch Center, Inc. (The)	1918
Navigation Technologies	1806
Neomar, Inc.	613
NetMotion Wireless	1708
Neumobility	1707
NewLogic	2630E
NightFire Software, Inc.	1607
NK Cables USA, Inc.	3013
Nortel Networks	S30
Novarra, Inc.	S19
Novatel Wireless, Inc.	1413
Numerex Technologies	1043
Oberthur Card Systems	1046
Onset Technology	S14
Openwave	1001
Oracle	1737-1
Orsus Solutions	901
PacketVideo Corp.	3031
PHS Industrial, Inc.	291S
PIXO	2131
POS Integrators	2913
Protura Wireless	10S0
PTS Electronics	2322
Pumatech, Inc.	44S
QUALCOMM, Inc.	1620
QUALCOMM, Inc.	1631
RateIntegration	411
RCR Wireless News/Global Wireless	712
Research In Motion	2231
RF Connectors	1816
San Diego Pavilion	2S12
Schlumberger	2112
SECOS, Inc.	2119
Sensate, Inc.	2947
SensCom, Inc.	232
Sierra Wireless, Inc.	2031
SIGEM	S01
SignalSoft Corp.	1913
Sky International	1S01
SmartServ Online, Inc.	S07
SmartTrust	1143
SNAZ Commerce Solutions	2820
Sprint PCS	S13
Standard Communications	2018
Stellcom, Inc.	1919
SunView Mobile Systems	11S0
Sybase iAnywhere Solutions	607
Symmetry Communications Systems	2239
Synamics	1243
SYS-CON Media, Inc.	601
Telcontar	2937
Tele Atlas North America, Inc.	2139
TeleCommunication Systems	921
Telephia, Inc.	1939
Televoke, Inc.	201S
Telispark, Inc.	2844
Tellus Technology, Inc.	204S
TestQuest, Inc.	1947
ThinAirApps	1007
Togabi Technologies, Inc.	3327
Transport Technology Today	2721
Trimble Navigation	182S
Trintech Group PLC	13S3
TSI - Telecommunication Services, Inc.	2039
UniMobile, inc.	701
Veratium Software	13S2
VeriSign, Inc.	716
Verizon Wireless	2431
Vicinity	2036
VirtualTek Corp.	1713
VisionAIR	2218
Vocal Technologies Ltd.	2S24
VoiceGenie Technologies, Inc.	1037
V-Star, Inc.	1101
vVault, Inc.	722
Wavecom, Inc.	2923
WIDCOMM	2630A
Wired Pocket	1701
Wireless Developer Network (GeoComm Int'l.)	2S23
Wireless Knowledge	1801
Wireless Week	1731
Wmode, Inc.	2931
W-Technologies	S23
Xybo Systems	S10
Zucotto Wireless, Inc.	192S

Show Floor

CTIA WIRELESS I.T. & INTERNET 2001 will boast the largest and most comprehensive show floor in the wireless Internet and mobile data arena. We will bring to you every component of the wireless data solution from application to hardware.

NEW!

To reflect the constant innovations in wireless data technology and solutions and to make your tour of the show floor easier to navigate, CTIA is excited to showcase the latest technologies and applications in these special interest pavilions.

Developers Alley

Sponsored by

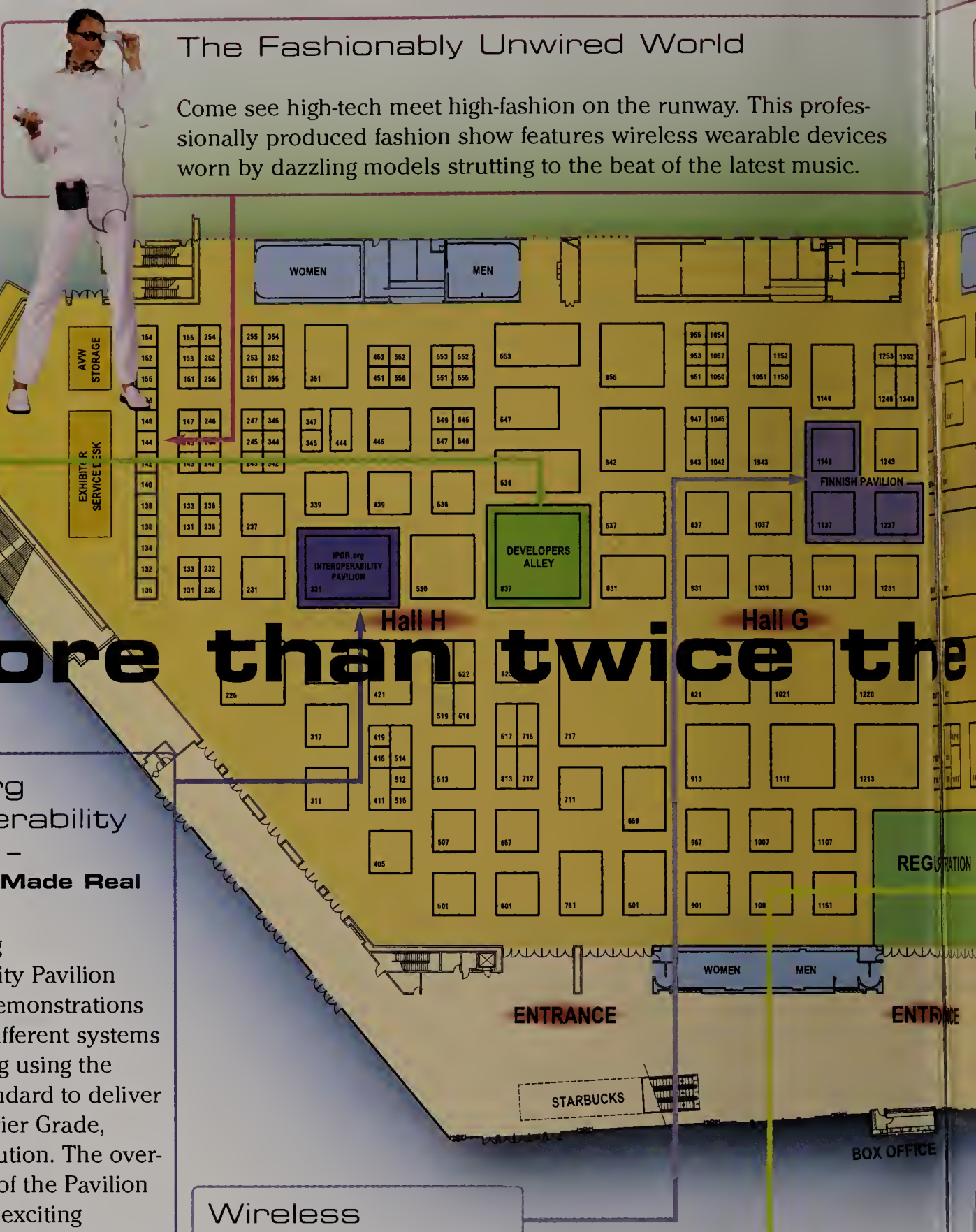
wireless DEVNET.COM "The Wireless Developer Network"

The Wireless Developer Alley is being hosted by the Wireless Developer Network (www.wirelessdevnet.com), the premier on-line community for information technology professionals interested in mobile computing and wireless communications. This year's Alley will consist of leading wireless technology companies offering solutions and services for voice applications, location based services, mobile java, and wireless data applications.

Stop by the Alley on the Main Show floor located in **Hall H.**

The Fashionably Unwired World

Come see high-tech meet high-fashion on the runway. This professionally produced fashion show features wireless wearable devices worn by dazzling models strutting to the beat of the latest music.



More than twice the

IPDR.org Interoperability Pavilion – **Solutions Made Real**

The IPDR.org Interoperability Pavilion showcases demonstrations of multiple different systems interoperating using the IPDR.org standard to deliver a robust Carrier Grade, Next-Gen solution. The overall objective of the Pavilion is to provide exciting demonstrations using next-generation voice and data services that highlight the effectiveness of the IPDR.org standard, and to show how service providers are able to cost-effectively offer next generation services as the industry continues to adopt the IPDR.org standard. The Pavilion participants are equipment vendors, mediation companies, and OSS and BSS vendors demonstrating next-generation services such as Video on Demand (VoD), Voice over IP (VoIP) and Wireless Applications (WAP).

Wireless Innovations Finland Pavilion

See cutting-edge wireless applications and solutions from leading Finnish companies. Finland is a global leader in wireless telecommunications and its unique development environment has spawned a growing number of technology start-ups that are seeking international partnerships.

Visit booth 1137.

Korean Pavilion

Visit the Korean Pavilion showcasing the latest technological advances from Korea and meet with companies manufacturing quality products with distribution worldwide making them critical players in the wireless space.

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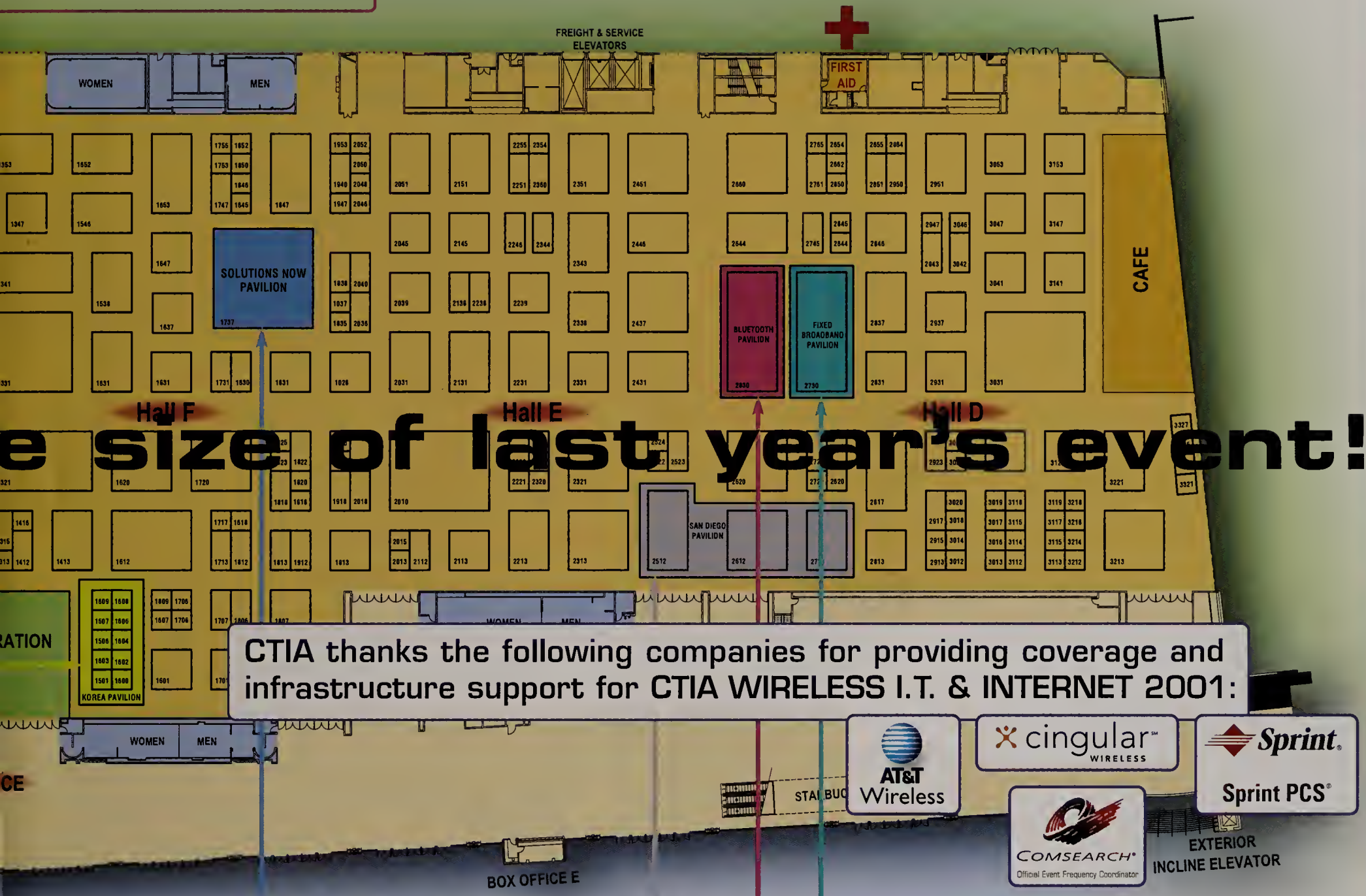

e size of last year's event!

CTIA thanks the following companies for providing coverage and infrastructure support for CTIA WIRELESS I.T. & INTERNET 2001:

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Sprint PCS
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Solutions Now Pavilion

This area is for WIRELESS I.T. & INTERNET participants who have enterprise solutions that are available TODAY (or within the next 6 months). CTIA will promote this pavilion to our high-level user audience as a must see if you are serious about integrating a wireless solution. Press will be drawn to this pavilion, as it will be an easy one-stop for hot solutions. There will also be an exclusive demo area for pavilion participants to show off their innovations.

San Diego Pavilion

The T Sector's San Diego Pavilion is a showcase of the wireless technology in San Diego. With over 500 telecom companies employing 25,000 high tech professionals here, San Diego has fast become one of the hottest telecom regions in the country. And with a magazine, *The T Sector,* focused soley on the high tech industry in San Diego, companies have a unique opportunity to come together to learn and grow like nowhere else. The San Diego Pavilion is just a small sample of what San Diego telecom has to offer.

The Bluetooth Pavilion

Exhibitors in this pavilion will be displaying the newest and hottest products that allow communication between components wirelessly. Cables are becoming a thing of the past; come experience the revolution in communication without wires.

Visit booth 2630.

Fixed Broadband Pavilion

Come see the technology that is leaving DSL and conventional dial-up modems in the dust. See the latest way to maximize your communication capabilities without having to worry about the number of users on your system or relying on a slow connection speed. By utilizing a single cell structure, fixed wireless broadband technology maximizes the bandwidth capacity, facilitating efficient, rapid transfer of data.

Visit booth 2731.

Hotel & Travel

CTIA has selected United Airlines and Southwest Airlines as the official carriers for **CTIA WIRELESS I.T. & INTERNET 2001.** You may contact the airlines directly at the phone numbers listed below. Please refer to the code listed in order to receive your travel discount. If you prefer to work directly with your travel agent, please give them the appropriate airline code.

United Airlines
1-800-521-4041
Code 502BE

Southwest Airlines
1-800-433-5368
Code R6651

Hertz has been appointed the official car rental company for **CTIA WIRELESS I.T. & INTERNET 2001.** Special discount rates are guaranteed and available from one week before through one week after the meeting dates, subject to availability.

For car reservations, call Hertz directly at 1-800-654-2240 and refer to **01PG0019** for conditions and qualifications that apply, including minimum rental age.

Hotel & Ammenity List

HOTEL	ADDRESS	RESTAURANT	ROOM SERVICE	BUSINESS SERVICES CENTER	HEALTH CLUB	POOL
1. The Bristol Hotel	1055 First Ave	YES	YES	NO	NO	NO
2. Best Western Bayside	555 W Ash Street	YES	YES	NO	YES	YES
3. Clarion Hotel Bay View	660 K ST	YES	YES	YES	YES	NO
4. Courtyard Marriott Downtown	530 Broadway	Breakfast Buffet	NO	NO	YES	NO
5. Embassy Suites - Bay	601 Pacific Hwy	YES	YES	NO	YES	YES
6. Hampton Inn Downtown	1531 Pacific Hwy	OPENING SOON				
7. Hilton Gaslamp Quarter	401 K ST	YES	YES	YES	YES	YES
8. Holiday Inn on the Bay	1355 North Harbor Dr	YES	YES	YES	YES	YES
9. Horton Grand Hotel	311 Island Ave	YES	YES	NO	NO	NO
10. Hyatt Regency	One Market Place	YES	YES	YES	YES	YES
11. Marriott Hotel & Marina	333 W. Harbor Dr	YES	YES	YES	YES	YES
12. The Westgate Hotel	1055 Second Ave	YES	YES	YES	YES	NO
13. Westin Horton Plaza	910 Broadway Circle	YES	YES	YES	YES	YES
14. Wyndham at Emerald Plaza	400 W Broadway	YES	YES	YES	YES	YES

Attendee Housing Form

Housing Form Deadline: 8/10/2001

This form is for Attendee Housing.

Complete the form on the back cover to register for the convention.

≫ Attendee Housing forms are processed on a first-come, first-serve basis based on room availability.

≫ If you are an exhibitor, use the housing form enclosed in your Exhibitor Forms Packet.

Mail

WIRELESS I.T. & INTERNET 2001
c/o CMR
33 New Montgomery, 14th Floor
San Francisco, CA 94105, USA

Fax

+1.415.979.2250

Online

www.wirelessIT.com

Phone

800.334.6147

International + 1.415.979.2268

1. INFORMATION Please print clearly

Full Attendee Name (First, Middle Initial, Last) _____ Company/Organization _____

Address _____

City _____ State _____ ZIP Code _____ Country _____

Phone _____ Fax _____ E-mail _____

2. HOUSING PREFERENCE

Room Type: ☐ Single ☐ Double

Arrival Date: _____ Departure Date: _____

_____
Individual with whom you are sharing a room (if applicable)

≫ Rate in order of preference (#1- #14) next to hotel.

___	The Bristol Hotel	$149	single/double
___	Best Western Bayside	$129/$139	single/double
___	Clarion Hotel Bay View	$150/$170	single/double
___	Courtyard Marriott Downtown	$185	single/double
___	Embassy Suites - Bay	$179/$199	single/double
___	Hampton Inn Downtown	$129	single/double
___	Hilton Gaslamp Quarter	$200	single/double
___	Holiday Inn on the Bay	$169	single/double
___	Horton Grand Hotel	$167	single/double
___	Hyatt Regency	$235	single/double
___	Marriott Hotel & Marina	$220	single/double
___	The Westgate Hotel	$170	single/double
___	Westin Horton Plaza	$235/$255	single/double
___	Wyndham at Emerald Plaza	$179	single/double

≫ Hotel guarantee amount will reflect hotel assigned.

≫ Hotel rates are subject to prevailing city room tax.

_____
Special Requests

Special requests such as bed type, smoking or room views will be considered ONLY on an "as-available" basis. This information is then forwarded to the hotels for consideration.

☐ Suite (If checked, CTIA will contact you)

3. DEPOSIT/GUARANTEE INFORMATION

No hotel reservation will be processed or confirmed without a check deposit or credit card guarantee in the amount of $200.00. All deposits will be non-refundable after August 10, 2001. Make checks payable to **CMR/WIRELESS I.T. & INTERNET**.

Please complete the following information.

☐ Check ☐ Master Card ☐ Visa ☐ AmEx

_____
Card Number Expiration Date

_____
Signature (for charge)

_____
Name and Organization as it appears on card

I authorize CTIA WIRELESS I.T. 2001 Housing to charge my account for housing fees for CTIA WIRELESS I.T. & INTERNET 2001, September 11-13, 2001.

≫ Please note that a small percentage of your room rate will go to CTIA to defray expenses of convention activities and shuttle bus service.

≫ Cancellation Policy: All deposits are non-refundable after Friday, August 10, 2001.

≫ You will receive hotel confirmation from the CTIA WIRELESS I.T. & INTERNET 2001 Housing Desk within 5 working days of receipt of your completed housing form.

Attendee Registration Form

CTIA WIRELESS I.T. & INTERNET 2001

SEPTEMBER 11-13, 2001

SAN DIEGO CONVENTION CENTER
SAN DIEGO, CA

» **THIS FORM IS FOR ATTENDEE REGISTRATION**
you must complete the HOUSING FORM to reserve Housing.
» Please complete one registration form for each person registe
» Full payment must accompany this form to be processed.
» ***CONFERENCE PRE-REGISTRATION DUE: 8/22/01***

THREE EASY WAYS TO REGISTER TODAY!

Fax 301-694-5124

Mail P.O. Box 3918
Frederick, MD 21705
(1888 North Market Street 21701)

Online www.wirelessIT.com

1. BADGE INFORMATION (please print clearly)

Full Attendee Name (First, Middle Initial, Last) | Title | Company/Organization

Address | City | State | ZIP Code | Country

Phone | Fax | E-mail [Required for registration confirmation only]
❑ Check here to receive show information via e-mail

❑ Please check here if under the American Disabilities Act you require any auxiliary aids or services.

2. CONVENTION/EXPOSITION REGISTRATION

The Smart Pass—BEST VALUE Includes admission to exhibit floor, keynote sessions, all CTIA educational sessions, refreshment breaks, and A.M Oppenheimer Business Valuation & Sale of Business Seminar [9/13]. Check one.

❑ Before 8/1/01 Member/Non-member [M5] $500/$650 [N5]
❑ After 8/1/01 Member/Non-member [M6] $600/$750 [N6]

Executive Passport Includes admission to exhibit floor, keynote sessions, CTIA educational sessions and refreshment breaks. Check one.

❑ Before 8/1/01 Member/Non-member [M1] $350/$450 [N1]
❑ After 8/1/01 Member/Non-member [M2] $450/$550 [N2]

Daily Rate—You must choose ONE of the days listed below. Includes admission to exhibit floor, keynote session, all CTIA educational sessions and activities for that day. Check one.

❑ Before 8/1/01 Member/Non-member
❑ After 8/1/01 Member/Non-member

❑ **Tuesday, September 11:** [E1] $175/$225 [E2] [E3] $225/$275 [E4]
❑ **Wednesday, September 12:** [E1] $175/$225 [E2] [E3] $225/$275 [E4]
❑ **Thursday, September 13:** [E1] $175/$225 [E2] [E3] $225/$275 [E4]

Exhibits Package Includes admission to exhibit floor, keynote sessions [9/11-9/13] and refreshment breaks [9/12 & 9/13].

❑ Before 8/1/01 Member/Non-member [M3] $55/$65 [N3]
❑ After 8/1/01 Member/Non-member [M4] $65/$75 [N4]

3. SPECIAL INTEREST SEMINARS [SIS]

The special interest seminars below include admission to exhibit floor [9/12 & 9/13], keynote sessions and refreshment breaks.

Wireless Data University – FULL DAY
Monday, September 10, 2001 [check one]

❑ Before 8/1/01 [WD1] $245
❑ After 8/1/01 [WD2] $295

Wireless Data University Graduate Course [check one]
Monday, September 10, 2001 – **AFTERNOON SESSION ONLY**

❑ Before 8/1/01 [WD3] $185
❑ After 8/1/01 [WD4] $225

❑ **Wireless Developers Seminar**—September 10, 2001
BONUS! CD-ROM. [P1] $395

A.M Oppenheimer Business Valuation & Sale of Business Seminar—September 13.
Available exclusively with the Smart Pass registration package.

4. PAYMENT INFORMATION/FORM OF PAYMENT

If paying by check, please make registration checks payable to **CTIA WIRELESS I.T. & INTERNET 2001.**

If paying by credit card, complete the following information.

❑ Check ❑ Master Card ❑ Visa ❑ American Express

$_____ Convention Registration Amount

$_____ Special Interest Seminars [SIS]

$_____ **Total Amount Due**

Card Number | Expiration Date

Signature (for charge)

Name and Organization as it appears on card

I authorize **CTIA WIRELESS I.T. & INTERNET 2001** Registration to charge my account for registration fees for the **CTIA WIRELESS I.T. & INTERNET 2001**, September 11-13, 2001.

Submission of this registration form confirms that I have read, I understand, I agree and will comply with the published Registration Cancellation Policy below.

5. POLICIES

Cancellations, substitutions and request for refunds will not be accepted by telephone and must be submitted in writing for consideration. Cancellations and refunds will be considered only if submitted in writing no later than the deadlines below:

» Cancellations received by 8/1/01—**Full Refund less $50 fee.**
» Cancellations received after 8/1/01, and prior to 8/22/01—**50% refund.**
» Cancellations received after 8/22/01—**No refund.**
» **There will be a $25 charge for badge substitutions.**
» Cancellations must be submitted in writing to **CTIA WIRELESS I.T. & INTERNET 2001** Registration P.O. Box 3918, Frederick, MD 21705 or fax 301.694.5124.

PLEASE NOTE: For Trade Only, no one under 18 years of age will be admitted onto the trade show floor.

CTIA
Building the Wireless Future.
Cellular Telecommunications & Internet Association
1250 Connecticut Avenue, NW, Suite 800
Washington, DC 20036

CIO

ATTENDEE PROFILE

What is your principal business? [check only one]

A. ☐ Applications/Software Developer
B. ☐ ASP—Application Service Provider
C. ☐ CLEC
D. ☐ Consultant
E. ☐ Content Provider/Aggregator
F. ☐ Enterprise/Corporate/SOHO End-User
G. ☐ Dealer/Retailer
H. ☐ Distributor/Reseller/VAR
I. ☐ Engineering
J. ☐ Field Sales & Service
K. ☐ Financial Services/Investment Banking/ Venture Capital
L. ☐ Fixed Wireless
M. ☐ Healthcare
N. ☐ ISP--Internet Service Provider
O. ☐ LEC
P. ☐ Manufacturer
Q. ☐ OEM
R. ☐ Systems Integration
S. ☐ Transportation
T. ☐ Utilities
U. ☐ Vertical Market, Other: _____
V. ☐ Wireless Portal
W. ☐ Wireless Service Provider [Narrow/ Broadband PCS, Cellular, CDPD, ESMR]

What is your purchasing involvement?

A. ☐ Directly responsible
B. ☐ Make recommendations
C. ☐ No involvement

What is your title classification? [check one]

A. ☐ Executive [CEO, CTO, CIO, COO, Chairman, President, etc.]
B. ☐ Management [Director, Manager, etc.]
C. ☐ MIS/IT
D. ☐ Engineering
E. ☐ Sales/Marketing/Business Development/PR
F. ☐ Administrative

What products or services are you interested in? [check up to 5]

A. ☐ 3G
B. ☐ Accessories
C. ☐ Antennas
D. ☐ Batteries
E. ☐ Billing/Accounting Systems
F. ☐ Bluetooth
G. ☐ Brokerage/Financial Services
H. ☐ CDPD Applications
I. ☐ Data Integration Services
J. ☐ Engineering Services
K. ☐ Enhanced Services
L. ☐ Fixed Wireless/Broadband
M. ☐ Handsets
N. ☐ Insurance
O. ☐ Location/Tracking Technology [GPS/GIS]
P. ☐ Mcommerce
Q. ☐ Networking Equipment
R. ☐ Networking Software
S. ☐ Power Supplies
T. ☐ Security
U. ☐ Test Equipment
V. ☐ Voice Recognition
W. ☐ Wireless Email
X. ☐ Wireless Handhelds/PDAs
Y. ☐ Wireless Information Services
Z. ☐ Wireless Internet/Web Access
AA. ☐ Wireless LAN/Desktop Access
BB. ☐ Wireless Middleware
CC. ☐ Wireless Data, Other: _____
DD. ☐ Wireless Services

CIO

The Tenth Annual

terprise Value Retreat & Awards Ceremony

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Harvard Business School Professor F. Warren McFarlan focuses his considerable energy on case studies which assess the strategic advantages, uncertainties and pitfalls of E-investments. Top IT and business executives actively participate in the thought-provoking and rigorous program designed to explore information technology's strategic value to the enterprise.

Tuesday evening everyone gathers for the dinner and award ceremony to honor this year's Enterprise Value Awards winners, and to celebrate the power of IT to fundamentally transform how business gets done.

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Off the Shelf

Edited by Carol Zarrow

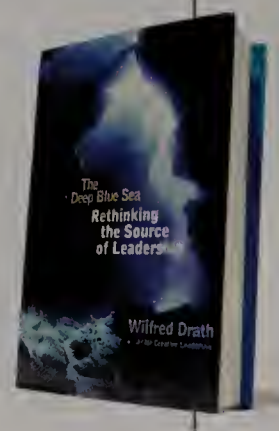
M&A Troika

Mergers & Acquisitions: A Guide to Creating Value for Stakeholders
By Michael A. Hitt, Jeffrey S. Harrison and R. Duane Ireland
Oxford University Press, 2001, $27.50

Mistrust any business book that has three authors. Writing by committee doesn't work any better than doing anything else by committee. Billed as a guide to successful mergers and acquisitions, this slight tome, *Mergers & Acquisitions* (how many e-mails did it take to come up with that one?) is a cobbled-together regurgitation of recent media articles and academic studies. It lacks a cohesive viewpoint about how companies should do mergers and acquisitions. It is puffed up with bland case studies that offer mostly numbers and events—with minimal interpretation and insight. If you plan to use this book as a basis for performing a merger or acquisition as the authors suggest, good luck. You may as well do it by committee.

–Christopher Koch

And...



The Deep Blue Sea: Rethinking the Source of Leadership
By Wilfred Drath
Jossey-Bass, 2001, $27.95

Karl Zoffner, fictitious founder of a fictitious piano company, is forced to pass his leadership to his daughter Elena. She then faces the daunting task of leading employees who remain fiercely loyal to her father. Complicating matters further, she too is convinced that she will not be able to escape the shadow of her father's influence.

Using this corporate and personal drama as his backdrop, Wilfred Drath, a senior fellow at the Center for Creative Leadership, explores three principles of leadership: personal dominance, interpersonal influence and relational dialogue. *The Deep Blue Sea* is dense with such terminology, but by interweaving the Zoffners' story with his text, Drath fortunately lightens its tone overall, even as he nudges the reader to think outside the box with regard to corporate leadership.

–Lisa Sydney

CIO Best-Seller List

5.
The Art of War
by Sun Tzu, ed. by James Clavell
Delacorte Press, 1989

4.
First, Break All the Rules: What the World's Greatest Managers Do Differently
by Marcus Buckingham and Curt Coffman
Simon & Schuster, 1999

3.
Now, Discover Your Strengths: The Revolutionary Program That Shows You How to Develop Your Unique Talents and Strengths—And Those of the People You Manage
by Marcus Buckingham and Donald O. Clifton
The Free Press, 2001

2.
Fish! A Remarkable Way to Boost Morale and Improve Results
by Stephen C. Lundin, Harry Paul and John Christensen
Hyperion, 2000

1.
Who Moved My Cheese? An Amazing Way to Deal with Change in Your Work and in Your Life
by Spencer Johnson
The Putnam Publishing Group, 1998

SOURCE: APRIL 11, 2001–JULY 11, 2001 DATA, COMPILED BY POWELL'S BOOKS, PORTLAND, ORE.

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Read book reviews, excerpts and interviews with best-selling authors in the **READING ROOM** at www.cio.com/books.

Book Talk

"If you're going to pursue a strategy, you must be willing to make hard choices and act as if you truly believe in your own strategy. In short, executing a strategy takes courage. You must be willing to practice what you preach, when it is convenient and (most importantly) when it is not."

–From *Practice What You Preach: What Managers Must Do To Create a High Achievement Culture*, by David H. Maister (The Free Press, 2001)

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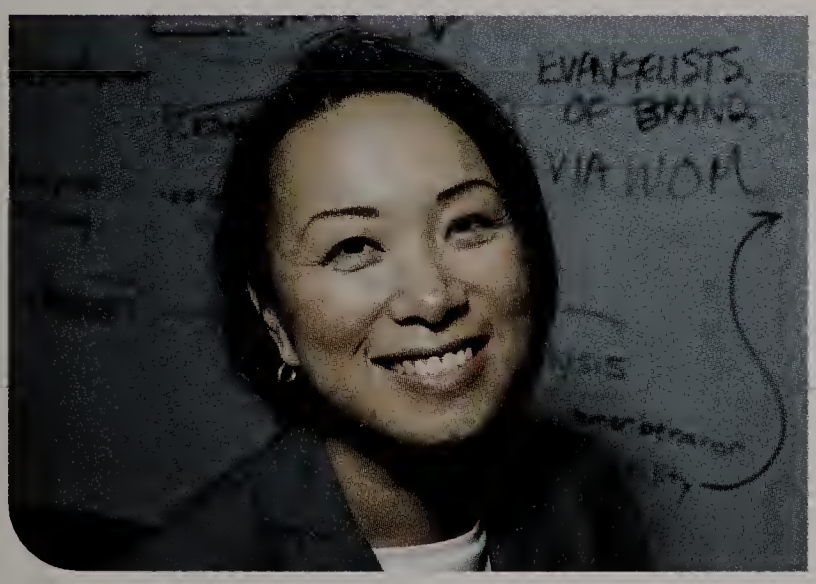

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HUMAN RESOURCES

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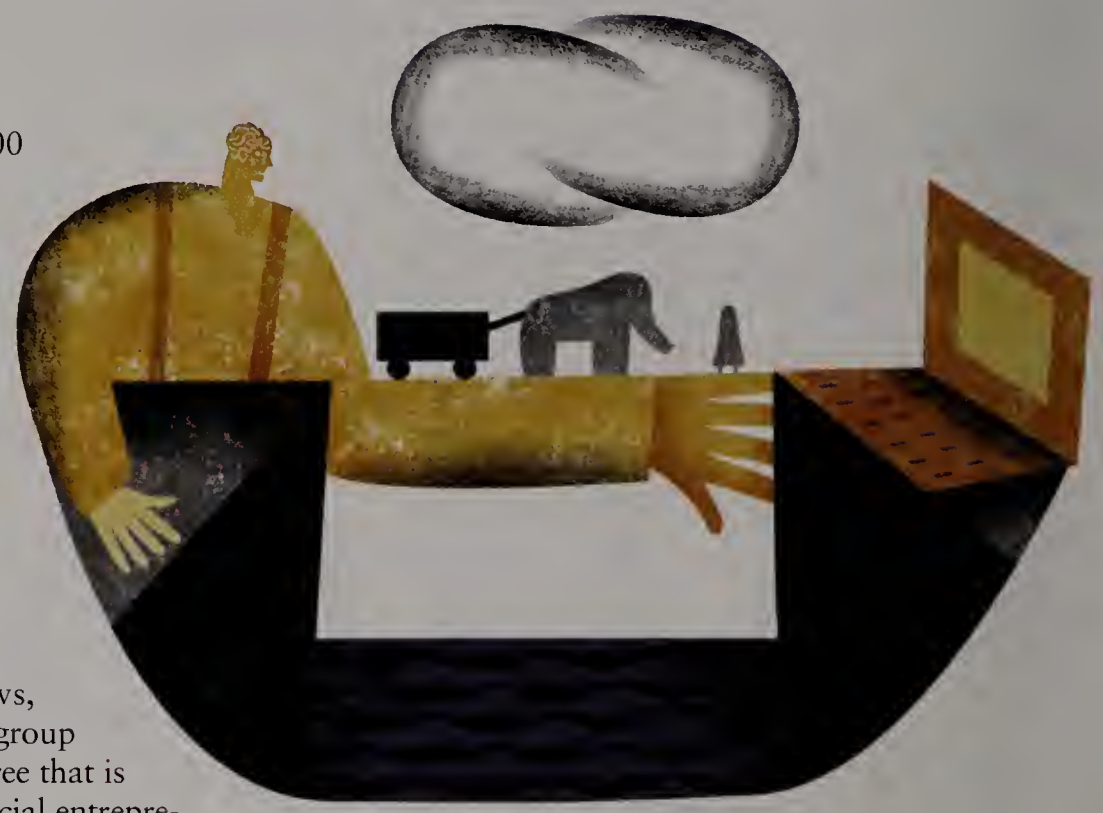
A World of Difference

By Stewart Deck



SUNIL ABRAHAM has not only helped wire 6,700 volunteer organizations in India by getting them Internet access, but he's also teaching them how to use the Internet for networking and fund raising. In the city of Bangalore alone, Abraham's consulting and technology services organization, called Mahiti, has brought 570 groups online.

Rodrigo Baggio has opened more than 200 financially self-sufficient computer schools in some of Brazil's most destitute communities. Baggio's group, the Committee to Democratize Information Technology, has trained more than 65,000 students to use computers, and his training schools are spreading to Chile, Colombia, Japan, Mexico and Uruguay.

Both Abraham and Baggio are Ashoka Fellows, their work built on seed money from the nonprofit group Ashoka, based in Arlington, Va., a CIO-100 honoree that is quietly changing the world. These two so-called social entrepreneurs and more than 1,100 people like them are on the verge of bringing about extraordinary global changes, says William Drayton, Ashoka's CEO and founder. "Ashoka's core idea is that the world is in the midst of a profound historic change, catalyzed by social entrepreneurs," he says. Ashoka, like a venture capitalist, bestows fellowships on people whose ideas can change social systems and bring replicable services and ideas to underdeveloped and deprived areas worldwide, Drayton explains.

Through a rigorous selection process, Ashoka finds individuals who are social catalysts and provides them with a three-year fellowship and a connection to a network of similar thinkers around the world. Giving the money to individuals instead of programs launches irresistible forces that bring about profound societal changes, says Drayton, a former MacArthur Foundation Genius Grant recipient. "We want to cut in at the life-cycle moment of the idea when a small investment of money and colleagueship can have a huge impact," he says.

Last year Ashoka awarded its first 10 Ashoka Fellowships to people in the United States, including Paul Rice, who founded TransFair U.S.A. to assist family coffee farmers with fair pricing, and D.J. Powers, whose Austin, Texas-based Center for Economic Justice brings basic economic services to low-income and minority Americans.

Drayton says the best is yet to come. "In four or five years Ashoka's impact will be many multiples of what it is today as many of these new programs take hold," he says. "There is nothing more powerful than a new, pattern-changing idea if it's in the hands of a continental-scale social entrepreneur."

For more information on Ashoka, visit *www.ashoka.org*.

"We care about what we do [at work] because we spend 70 percent of our time at it. It makes sense. **But sometimes we confuse the product with the end.** You know? I may work for General Mills, but I don't want to meet a person who gets hot and bothered about a bowl of cereal. **That's a scary, psychopathic person."**

–Scott Lutz, president and CEO, 8th Continent, a 2001 CIO-100 honoree

ILLUSTRATION BY JAMES O'BRIEN

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A brief discussion on the challenges of working independently. Business success is the product of a strong partnership. One which ensures that all bases are covered, such as storage, security and networking. One that brings about entirely new products and easier processes. One that helps you save more time, save more money, even pioneer profitable, new business niches. This kind of partnership is hard to find. You might say almost impossible. Until you talk to a GE Access Solution Provider.

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CIO 14th ANNUAL 100

This year's CIO-100 honorees stay ahead of the pack by creating breakthroughs in ***Products, Relationships*** *and* ***Processes***

OVERVIEW

INNOVATION GENERATION

Innovation—easy to say, hard to do. As we labored to compile 100 innovators for this year's CIO-100 list, we kept stopping to ask, Wait a minute, just what is innovation? A lot of people use the word glibly—the business equivalent of "I woke up this morning and had tea instead of coffee. Wasn't that innovative of me?" So we would pause and reaffirm that to us, innovation meant turning one's knowledge

CONTENTS

Investing During Slowdowns
Hard Times Are the Best Times Page 62

Product Development
Twist and Spout—INTERNATIONAL PAPER Page 72

Business Processes
Concrete Ideas—CEMEX Page 78

Relationships
Got Soy—8TH CONTINENT Page 84

Best Practices
Quick Change Artists Page 90

Environment
Green Lights Page 101

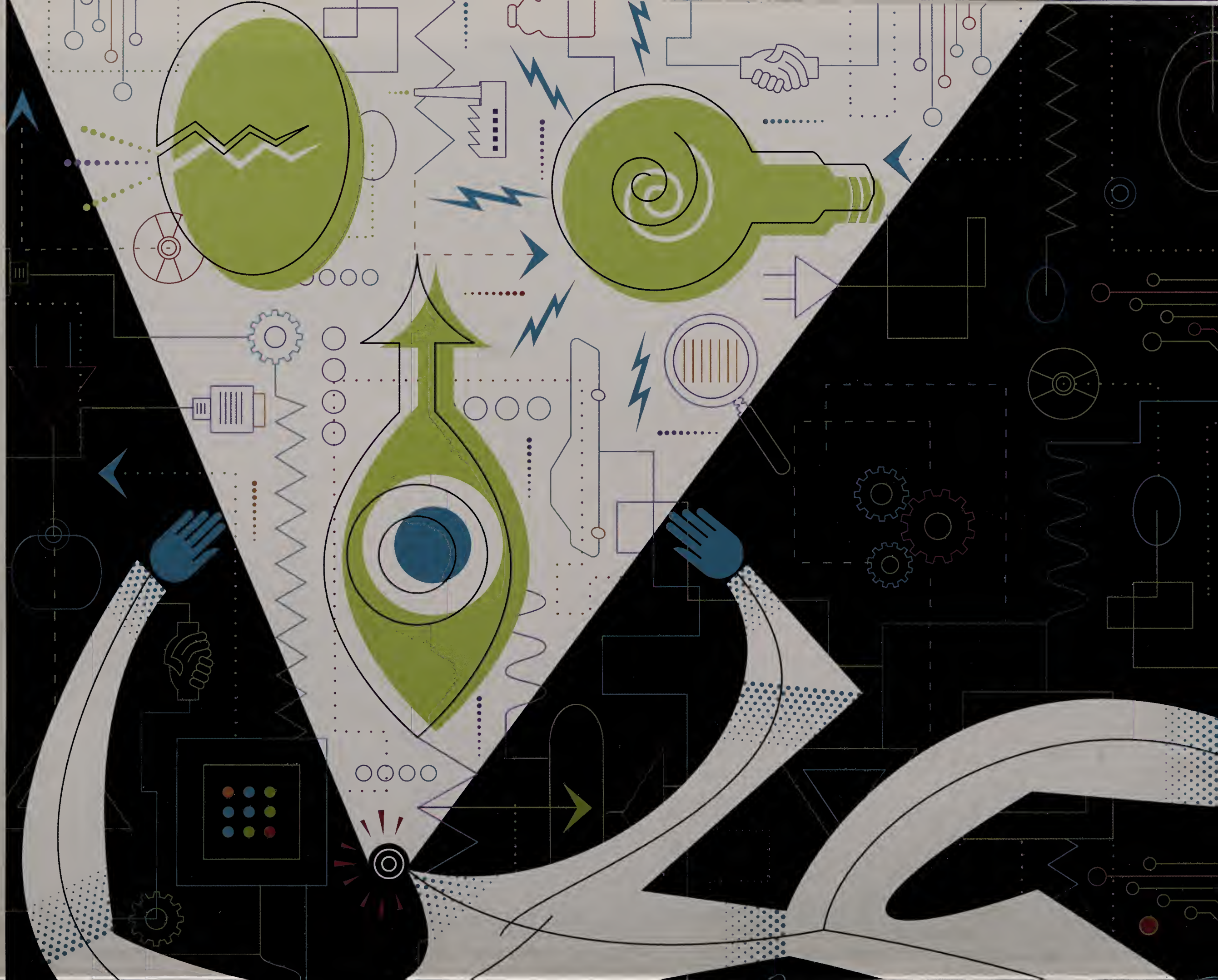
The CIO Role:
Martha Stewart's Omnimedia
What Makes Sheila Run Page 106

Think Tank
How Things Change Page 116

New Fields of Opportunity
Good Idea, Bad Timing Page 129

The Honorees
2001 CIO-100 Honorees Page 132

BY SANDY KENDALL ■ *Illustration by Campbell Laird*



Overview

or capabilities into money by creating new products, processes or relationships that yield competitive advantage.

Then we'd reimmerse ourselves in the topic of innovation and think ourselves into circles until we'd ask, Wait a minute, why does innovation matter? When we lifted our heads, our vision would clear and we'd remember the answer: business success.

Innovation is an essential nutrient for growth. That's particularly true in lean economic times. As many have cleverly said, you can't downsize your way to growth or save your way to prosperity. Organizations may find it tempting to the point of necessity to trim R&D and other innovation initiatives when times get tough, but that is a dubious path to success (see "Hard Times Are the Best Times" on Page 62).

Not every invention can be as momentous as the wheel or the internal combustion engine or the Internet (thank God—imagine the chaos). Smaller developments can have lifesaving effects for businesses too. For example, using integrated map and data software as well as a wireless LAN was enough to give CIO-100 honoree **Southwest Gas** a huge boost in productivity, and therefore profitability. Those smaller scale innovations raise an intriguing question: What actually constitutes innovation, as opposed to simply change or improvement? This is a topic tackled by thought leaders, academicians and practitioners—and recently by our CIO-100 editorial team in selecting this year's 100 companies. When is an upgrade just an upgrade, or when does it open whole new vistas? Predictably and inconveniently, there's no quantitative and agreed-on answer. For instance, even incremental change can be innovative, when it seeks to do more than just fix things that should have been done right the first time around.

ACHIEVING INNOVATION

As the CIO-100 honorees can attest, true innovation is an attainable goal. For instance, one good piece of advice is for companies to maintain a balance of blue-sky, really out-there ideas and of readily attainable, less risky ideas that are under investigation. That "balanced portfolio" approach recommends always having both incremental changes and radical, breakthrough ideas in the works. Our story "Quick Change Artists" (see Page 90) describes how to implement certain innovations in 90 days or less. The balanced portfolio approach offers the same opportunities for gains with a reasonable amount of security that a balanced stock portfolio offers an investor.

For our purposes in selecting the CIO-100, to distinguish simple improvement from real innovation, we looked at each case unto itself and then considered it against its industry or the world at large. We opted not to focus strictly on IT innovation, because although IT products and practices are definitely a hotbed for change and growth, IT has become so deeply integrated into other realms of most enterprises that it's hard to imagine a sizeable organization innovating without IT. We looked for developments that showed a notable departure from past practice with a promise of significant benefits. We also bore in mind company culture and history to recognize companies with a venerable tradition of innovation, such as **3M**, **Capital One Financial**, **Enron** and **Intel**.

We were looking for more than just product innovation too. We wanted the scope of innovation we considered to encompass products as well as business processes and relationships in and among organizations. We've profiled companies illustrating each of those arms of innovation, though there are many fine representatives of each. We track **International Paper**'s tale of product innovation in "Twist and Spout,"(see Page 72) profiling the development of its now familiar drink containers' Spout-Pak. Our list teems with companies that have brought to market innovative products, from **Honda**'s hybrid car to **SBC Communications'** "technician of the future." We portray a stellar business process innovation in the story of **Cemex** (see "Concrete Ideas," Page 78), which is keeping good company with other process innovators such as the **American Red Cross**, **The Mitre Corp.** and **Zara**. The subtlest of

METHODOLOGY

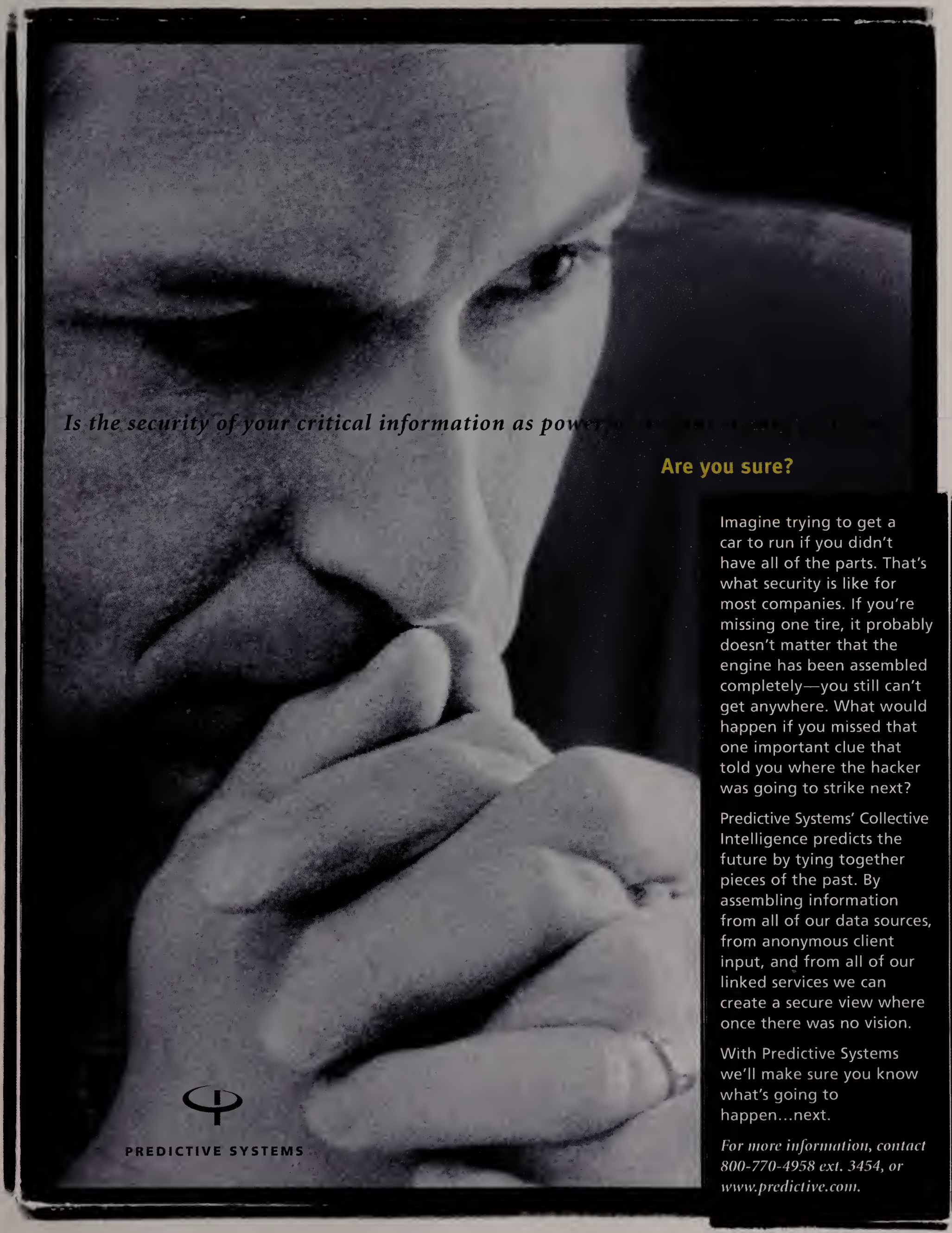
Choosing 100 innovative companies was no easy task. Here's how we did it.

First we opened up the nomination process so that companies could nominate themselves. We also set up a nomination procedure for *CIO* staff and our distinguished panel of experts assembled for this issue (see "The Experts," Page 56).

Through those channels, we amassed a base of approximately 1,000 companies to weigh and consider. We wanted a list that would represent innovation at both large and small companies, deep-pocketed corporations and nonprofit organizations, young companies and old ones, companies in a variety of industries, and companies whose initiatives or achievements represent the gamut of what is subsumed in the word *innovation*. Our special issue editorial team scoured applications and back-up materials, brought knowledge of their own, discussed and debated, and finally got the list to 100.

We wish to thank every company that participated in the process and cooperated with us on this project. We feel that we have identified an outstanding group of organizations, which in a variety of ways provide a model for executing creative ideas and turning them into true innovations.

–S. Kendall



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Imagine trying to get a car to run if you didn't have all of the parts. That's what security is like for most companies. If you're missing one tire, it probably doesn't matter that the engine has been assembled completely—you still can't get anywhere. What would happen if you missed that one important clue that told you where the hacker was going to strike next?

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innovations, those pertaining to relationships, are exemplified by **8th Continent** (see "Got Soy," Page 84), the feisty offspring of General Mills and DuPont. Other relationship innovators include **Autobytel.com** and **Starbucks**, to name a few.

REAL-WORLD SOLUTIONS

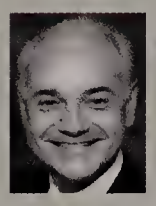
For our honorees, innovation initiatives must solve a real problem or answer a significant question. For example, CIO-100 honoree **Quantum Magnetics** saw the need for landmine and explosives detection in this dangerous world, and realized magnetic resonance technology could be used to satisfy that need. When **Patagonia** foresaw energy difficulties in California, it designed breakthrough energy-saving warehouses in that state. (See "Green Lights" for other innovations responding to environmental issues, Page 101.) Making sure an innovation responds to a real-world need helps avoid pursuing a dead end in the excitement over something new just for newness' sake. Not answering a question or solving a problem is a quick road to a short shelf-life for any innovation. In his book *Innovating the Corporation*, one of our special issue advisers, Thomas Kuczmarski, points out, "Notable innovation failures like Miller Clear Beer...resulted from a lack of understanding of customers and their problems. Miller Clear Beer was introduced as part of the 'clear craze' that swept the United States in 1992. The product failed because it didn't offer any meaningful benefit to consumers."

Of course, you've got to tackle innovation initiatives in a judicious and organized way wherever possible. Political, economic, personal and organizational obstacles lie in wait like snakes and sudden chasms in an *Indiana Jones* movie. As CIO-100 honoree **NetForm International** CEO and former archaeologist Karen Stephenson observes, "Modern corporations are more dangerous than anything I've ever seen in the rain forest." To see close-up how one IT executive faces the challenges of working for a high-

THE EXPERTS

The 2001 CIO-100 panel of distinguished experts includes academicians, analysts and consultants, who have expertise in a broad range of industry and technology areas with a special focus on innovation. Read "Methodology" (Page 54) to see how the CIO-100 honorees were selected.

Gary Hamel Chairman of Strategos, a strategic innovation consultancy in San Francisco; visiting professor of strategic and international management at the London Business School; author of *Leading the Revolution* (Harvard Business School Press, 2000).



Thomas Kuczmarski Senior partner and president of Kuczmarski & Associates, a consulting company in Chicago; adjunct professor of marketing at Northwestern University's Kellogg Graduate School of Management and The University of Chicago Graduate School of Business; author of *Innovating the Corporation* (NTC Business Books, 2000).

Thornton A. May Corporate futurist and chief awareness officer at Guardent in Waltham, Mass.; adjunct faculty member at the John Anderson Graduate School of Management at UCLA; responsible for designing and delivering the IT portion for the Berkeley Executive Program curriculum, presented by the University of California at Berkeley Haas School of Business.

Anita McGahan Professor of strategy and management policy at the Boston University School of Management; associate professor of business administration, competition and strategy division at the Harvard Business School.

Howard A. Rubin Executive vice president and research fellow of the Meta Group in Stamford, Conn.; professor emeritus at Hunter College of CUNY; author of the annual "Worldwide Benchmark Report."

Michael Schrage Merrill Lynch Forum fellow and director of the Forum's Innovation Grant Competition; research associate with the MIT Sloan School's Center for Coordination Science and the MIT Media Lab; author of *No More Teams!: Mastering the Dynamics of Creative Collaboration* (Currency/Doubleday, 1995) and coauthor of *Serious Play: How the World's Best Companies Simulate to Innovate* (Harvard Business School Press, 1999).

Jim Sims CEO and cofounder of Gen3 Partners in Boston; founder of both Cambridge Technology Partners and Concurrent Computer.

Alister Sutherland Program director of The Contenders: Emerging Services Innovators program at IDC (a sister company to *CIO*'s publisher, CXO Media) in Toronto; senior analyst and e-business and professional services consultant for Strategic Acquisitions.

Richard W. Swanborg President and founder of ICEX, a research and content management company in Boston; teacher of business strategy and IT at Boston University's School of Management.

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powered boss at a company that is constantly pursuing innovation, check out "What Makes Sheila Run" (Page 106) to read about Sheila Beauchesne, the senior vice president and CIO at **Martha Stewart Living Omnimedia**.

Different experts offer different models for how to organize your business for maximum innovation success. For example, some say innovation should be a separate business discipline but all agree that it must include top management's total support and ways to get around risk aversion—the biggest barrier to innovation. Universally, experts advise offering rewards and recognition for successes, and safety for reasonable failures. As Anita McGahan, another CIO-100 expert says in our roundup of expert views (see "How Things Change," Page 116), "The only true failures are experiments in which nothing is learned."

Read on to learn how some of the CIO-100 honorees are tackling the daunting challenge of making innovation central to their products, processes or relationships. CIO

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To read past **CIO-100 ISSUES,** log on to www.cio.com/cio100.

Where does innovation fit in the picture at your organization? Share your company's experiences with Departments Editor Sandy Kendall via e-mail at *skendall@cio.com*.

CIO-100 HONOREES INDEX *For a detailed list of honorees, see Page 132*

3M 52, 62, 132
8th Continent LLC 26, 52, 84, 132
Adaptive Computer .Technology Centre 132
Alcoa Inc. 132
American Red Cross 132
Ashoka 132
Autobytel.com Inc. 52, 132
Ballard Power Systems Inc. 132
Barton Malow Co. 132
Best Buy Corp. 132
BP PLC 132
Capital One Financial Corp. 52, 132
Cargill Inc. 132
Cemex S.A. de C.V. 52, 78, 132
Charles Schwab & Co. Inc. 90, 132
City of Phoenix 132
Covisint LLC 132
Dollar Rent a Car Systems Inc. 62, 132
Dow Chemical Co., The 101, 132
Eastman Chemical Co. 132
Electrolux LLC 132
Energizer Holdings Inc. 132
Enron Corp. 52, 132
ETC Music Inc. 132
FedEx Corp. 62, 101, 132
FMR Corp. 132
Foley & Lardner 26, 132
Gateway Health System 132
GE Medical Systems 132
Home Shopping Network (HSN) 132
Honda Motor Co. Ltd. 52, 132
IBM Corp. 90, 129, 132, 148
iBuilding Inc. 132
Ingram Micro Inc. 132
Intel Corp. 52, 132
International Paper Co. 52, 72, 132
ISpheres Corp. 132
Johns Hopkins Hospital
Wilmer Eye Institute 132
Keybowl Inc. 26, 132
Krispy Kreme Doughnut Corp. 132
KSolutions Inc. 132
Labbook Inc. 132
LabMorgan 132
Lands' End Inc. 132
Leading Hotels of the World Ltd., The ...132
Loka Institute 132
Mapping Your Future 132
Marriott International Inc. 132
Martha Stewart Living
Omnimedia Inc. 52, 106, 132
Material Innovations Inc. 132
Millennium Teleservices 132
Mitre Corp., The 52, 132
NetForm International Inc. 52, 132
Newport News Shipbuilding Inc. 132
Nokia Corp. 132
Nortel Networks Corp. 132
Northwest Airlines 90, 132
Oncology Therapeutics Network 132
Palm Inc. 132
Patagonia Inc. 101, 132
Paul, Hastings, Janofsky & Walker LLP ..132
Pfizer's Discover Technology Center 132
PHH Arval 132
Progressive Casualty Insurance Co. 132
Quantum Magnetics 52, 132
QVC Inc. 132
Red-M 132
Royal Bank of Canada 132
Royal Caribbean Cruises Ltd. 132
Rumsey Engineers Inc. 132
SBC Communications Inc. 52, 132
S.C. Johnson & Son Inc. 101, 132
Securities Industry Automation Corp. ...132
Sentara Healthcare 132
Snap-On Inc. 132
Software AG Inc. 132
Southwest Gas Corp. 52, 132
Staples Inc. 132
Starbucks Corp. 52, 132
Stream Theory Inc. 132
Swatch Group Ltd., The 26, 132
Tenet Healthsystems Information
Systems 132
Transclick Inc. 26, 132
TruServ Corp. 62, 132
Tufts University 132
United Parcel Service
of America Inc. 101, 132
United States Joint Forces Command ..132
U.S. Coast Guard Electronic System Support
Unit Boston 132
Vanguard Group Inc., The 52, 132
VirtualBank 132
Visa International Service Association ..132
VocalPoint Technologies 132
Waste Management Inc. 132
World Wide Retail Exchange LLC 132
W.W. Grainger Inc. 132
Wyndham International Inc. 90, 132
Xtime Inc. 132
Yellow Freight System Inc. 26, 132
Zara 52, 132
Zipcar 132

1. This is the CUSTOMER
2. That accessed the Account
3. That linked with the Database
4. That verified the Deposit
5. That released the Funds
6. That paid the Loan
7. That updated the Records
8. That triggered the Statement
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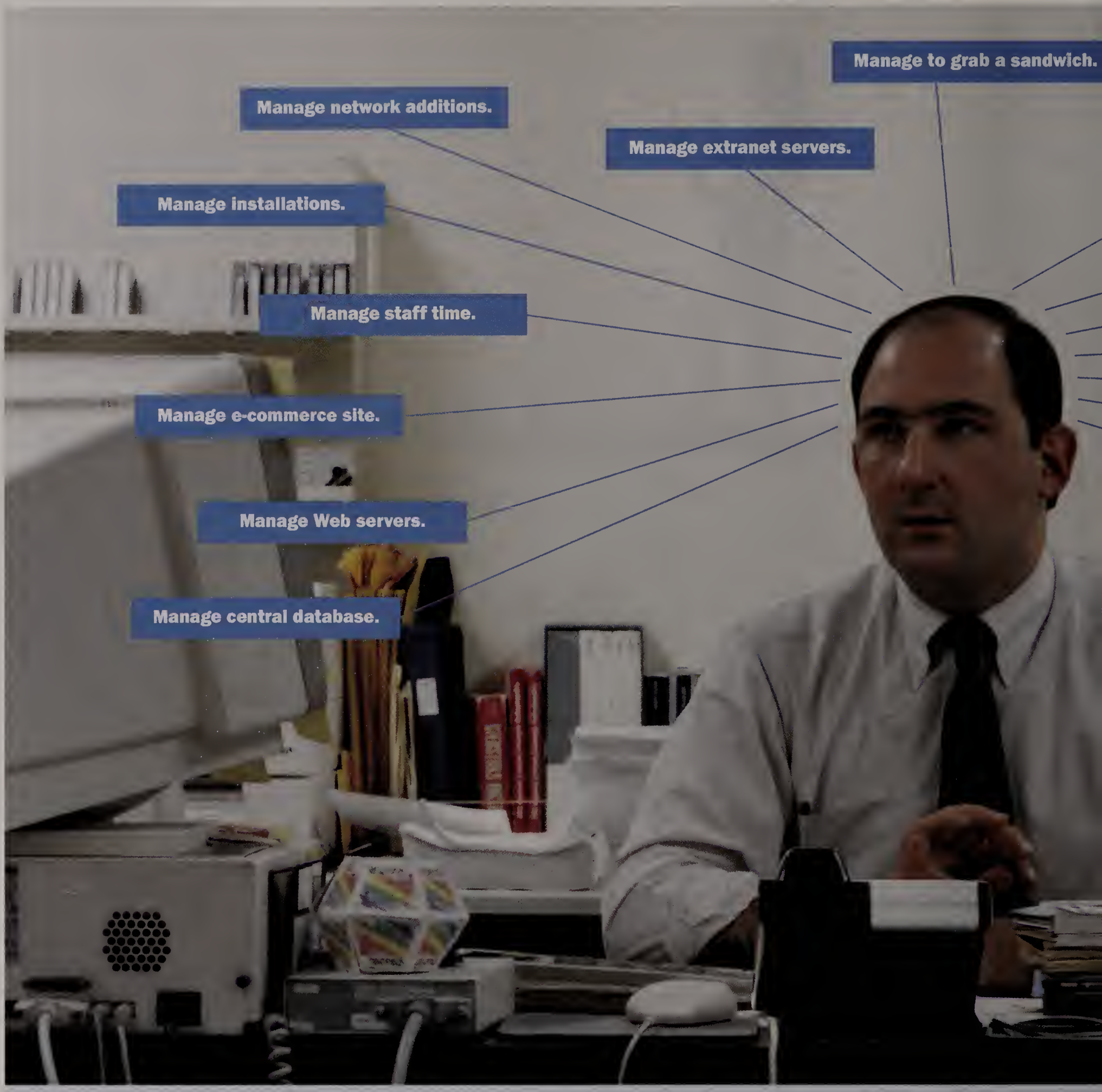

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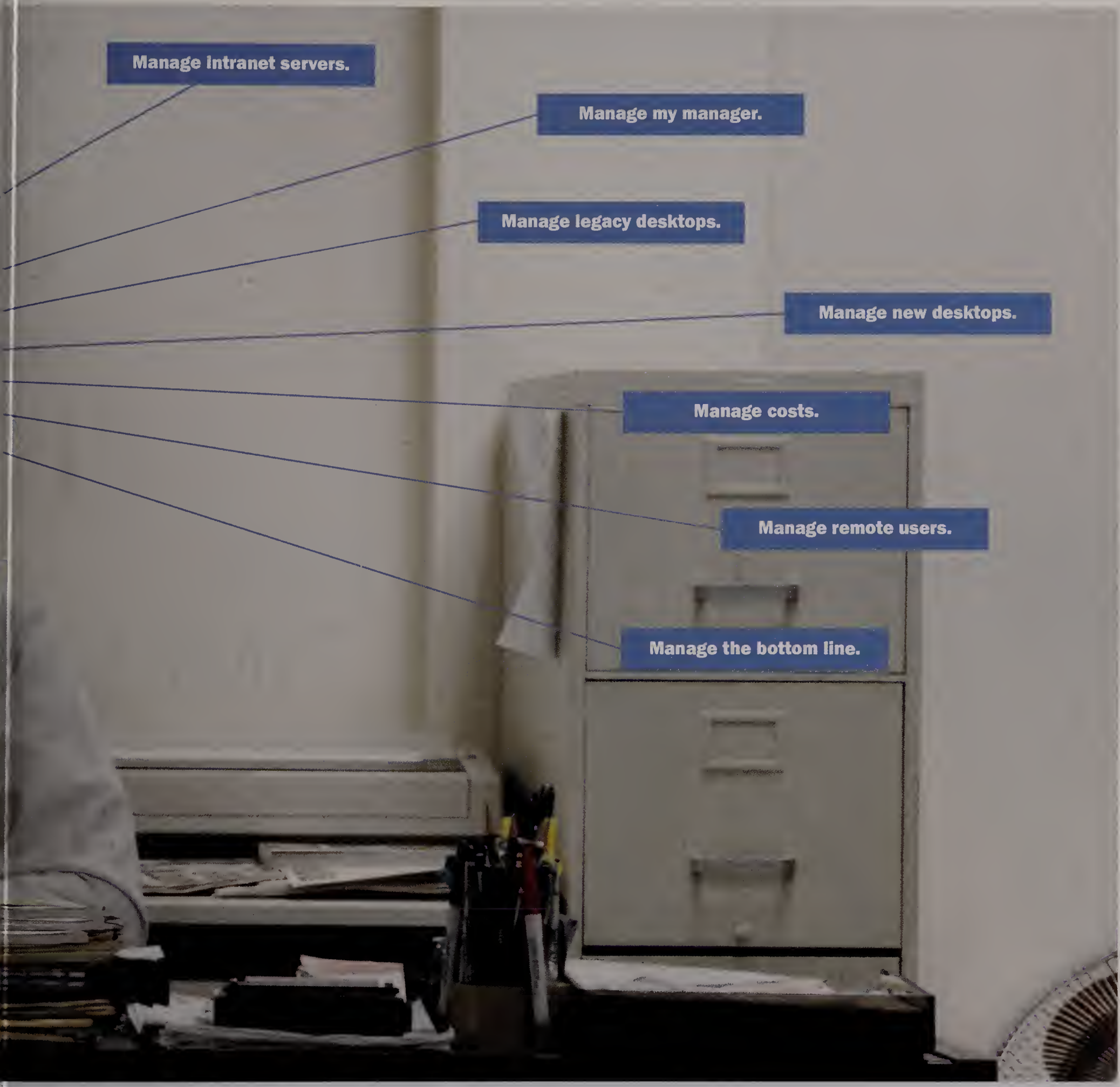

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No matter how precious the dollars, the companies that continue to look for new ways to do business are the companies that succeed

HARD TIMES ARE THE BEST TIMES

BY LEE PENDER

Photograph by Steve Wolt

IN 1982, DAVID P. DREW, THEN INTERNATIONAL DIRECTOR OF I.T. at 3M, began to work on a project to standardize the company's IT operations around the globe. In 1988, when Drew was done, 3M had one global infrastructure instead of a separate operation in each of the 63 nations in which it maintained a presence.

3M's globalization project was way ahead of its time. The company developed templates for global implementations that are still applicable more than a decade later.

Pretty impressive. But what makes 3M's 1982 globalization project truly extraordinary is the fact that it was launched during an economic downturn.

3M Vice President of IT David P. Drew: *"You're forced to be creative and innovative because you have less resources."*

Investing During Slowdowns

By no stretch of the imagination was 1982 a good year. Unemployment averaged 9.7 percent, its highest level since the Great Depression. In November 1982, the unemployment rate hit a whopping 10.8 percent. The inflation rate that year hovered just above 6 percent. (Compare those figures with those from 2000, which saw 4 percent average unemployment and an inflation rate of 3.4 percent.)

For most companies, 1982 was a time to pull back, hunker down and mark time while studying the Machiavellian maneuvers of J.R. Ewing on *Dallas*. For 3M, it was a time to innovate.

And 3M is still reaping the benefits. The template-based approach and centralized management it developed then has helped it keep its IT headcount low—lower, indeed, than it was in the early '80s. According to Drew, now 3M's vice president of IT, this allowed the company to breeze through the IT worker shortage that hamstrung corporations throughout much of the dotcom boom. In fact, with an IT budget that's 35 percent larger than it was in 1982, 3M today employs 25 percent fewer IT workers than it did then.

> "IF WE HAVE TO PULL BACK on back-office or service capabilities, we will. We will *not* pull back on customer-facing technologies."
>
> –FEDEX EXECUTIVE VP AND CIO ROBERT B. CARTER

As 3M knew, innovation is most valuable when the economy is down-and-out. That's when a company can separate itself from the pack. In good times everybody has lots of ideas and enough money to fund most of them. In bad times companies have to pick and choose. And that means they have to think analytically and creatively.

It's risky innovating when the dollars budgeted for projects are precious. But when the markets rebound, those who have been innovating all along will be ahead of those who haven't been.

WHAT 3M AND FEDEX KNOW THAT YOU DON'T

Companies with a history of innovation have built legends and large revenue bases by capitalizing on good ideas in good times and bad. Drew believes that difficult economic times are actually a spur to innovation. "You're forced to be creative and innovative *because* you have less resources with which to work," he says.

Take Scotch tape. 3M engineers developed it and masking tape during the biggest downturn of them all, the Great Depression. Boldly, 3M established its Central Research Laboratory in 1937, the deepest trough of the Depression, just to let its engineers and researchers fool around with new materials. By the end of the '30s, the lab had not only come up with new adhesives and abrasive materials—the company's core products—but also reflective materials that made highway signs and markings easier to see on dark and stormy nights. Over time, 3M turned those innovations into billions of dollars in sales.

The idea that a bad economy is an invitation to innovate is now a core 3M belief. As 2001 began, and all the major economic indicators continued pointing south, W. James McNerney Jr., who became 3M's CEO last January, launched a set of initiatives jointly called Acceleration. The plan moves responsibility for product development away from the company's individual business units and back to the corporate office so that the corporation itself can step

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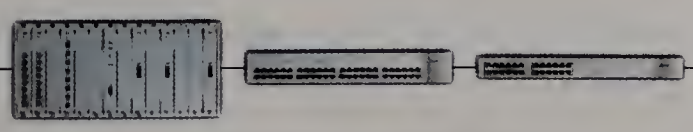

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in with dollars when a unit doesn't have the budget to support an innovative project.

With that level of executive commitment, Drew is sinking his resources into new projects, such as collaborative engineering tools, and cutting back on standby programs, such as internal user support. Drew says he's managed to pacify his users by creating a data warehouse that gives them access to information, such as where to find a list of accounts receivable to generate a report, that they used to have to call an IT person to dig up. And he says his department has actually cut costs by installing the new technology. In order to do any of these things, Drew says, it's critical to have a mandate from the top to put innovation over user convenience.

Another company with a history of innovating in hard times is Memphis, Tenn.-based FedEx. FedEx spent the recessionary years of 1979 and 1980 introducing computer systems that managed shipments and coordinated pickups for customers. Then, when the economy slumped again between 1989 and 1991, FedEx developed a satellite-based system to locate vehicles and an early supply chain application that provided a centralized routing management service. Although FedEx's marquee technology accomplishment, its Internet-based tracking system, debuted in 1994 during the early days of the technology boom, the company is still expanding its Web presence even as the bloom fades from the dotcom rose.

In May, FedEx downgraded earnings expectations for its fourth fiscal quarter by nearly 30 cents per share, but Executive Vice President and CIO Robert B. Carter says the company is increasing its level of investment in Web customer service technology, despite his expectation that his overall IT budget will be cut. New projects include wireless access to package-tracking information and FedEx InSight, an application intended to allow people to customize their view of package deliveries and automatically receive notification via e-mail or fax when a package does or does not arrive as scheduled. InSight's customization capability eliminates the need for customers to use a package-tracking number every time they want to track a shipment. In other words, in an increasingly customer-centric business environment, the application tracks

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LAYING THE FOUNDATION: TIPS FOR INNOVATING IN HARD TIMES

Right now, while other companies are cutting IT budgets and initiatives, it's the perfect time for companies to establish the innovative products and processes that will carry them into the future.

1. FIRST, FIND THE MONEY The CIOs at 3M, Dollar Rent A Car, FedEx and TruServ have all cut back on user services—including maintenance, upgrades and new applications for internal customers—in order to continue to innovate with flat budgets.

"If we reduce the amount of time we spend on maintenance, that will give us more resources for development," says TruServ Senior Vice President and CIO Neil Hastie.

Another way to find the cash is to improve your processes. Companies can get cocky in good times and let important processes, such as application maintenance and involving the business side in software development, slide. When the financial belt tightens, so should internal processes.

2. THEN, GET CEO BUY-IN Senior-level buy-in is critical, especially if a CIO has to cut basic services such as user support in order to remain innovative. If that buy-in isn't part of the corporate culture, a CIO must fight for it.

Chris Curran, managing director for technology innovation at Chicago-based consultancy DiamondCluster International, says CIOs might have to work through layers of management to get the chance to bend a CEO's ear. "If the CEO isn't providing support, the next best thing is to get his direct reports to tell him how wonderful [new technology] is," Curran says. "CIOs should dialogue with business lieutenants in the company."

CIOs don't need to hit a home run their first time at bat, either. Singles and doubles will work fine when the goal is to win the attention of department managers and vice presidents. Curran suggests setting up prototypes for small projects. Detailing a long, expensive project—no matter how innovative—might scare off lower-level business leaders and CEOs alike.

3. FINALLY, PRIORITIZE The most important step a company can take in a downturn is to separate necessary projects from those that were just hanging around because once upon a time there was money to fund them. Whether it's trimming user support or buying less hardware, cutting the fat from an IT department is the best way to survive a downturn while still being able to innovate. Without exception, that's the message from this year's CIO-100 honorees.

"I'd rather live in good times and have a big budget," says 3M Vice President of IT David P. Drew. "But a lot of times we make the most progress when things are tighter. It forces you to focus. It forces you to eliminate things you probably shouldn't be doing. I don't wish for these times, but it isn't all a bad experience." *–L. Pender*

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Investing During Slowdowns

TruServ CIO Neil Hastie *has found the money to innovate by streamlining his software development process.*

shipments by user, not by package.

An unblinking focus on the Web makes sense for the company, even as it soaks up precious dollars. Just this year, more FedEx customers used its website for service than called the company's toll-free number. FedEx now averages 1 million package tracks a day at Fedex.com; it does fewer than 100,000 per day over the phone. That's important because, according to Carter, every call to the toll-free line costs the company $2.14 on average, while every customer inquiry on the website costs an average of 10 cents.

Like Drew, Carter has the support of his CEO in prioritizing innovation. And like 3M, FedEx is cutting back on supporting users and other basic services in order to fit new projects into the budget. Carter says the company will go even further to continue innovating if it has to.

"If we have to pull back on back-office or service capabilities, we will. We will *not* pull back on customer-facing technologies," he says. "It's a core part of the FedEx culture. We'd rather invest in [new technology] than in trucks or airplanes."

WHY TRUE VALUE'S HARDWARE BUSINESS NEEDED NEW SOFTWARE

Chicago-based TruServ is a new entity, formed in 1997 by a corporate merger, but its True Value hardware stores—a name familiar to hardware buyers since 1948—are not. Recently, the company became concerned that its cooperative network of store owners was relying too much on consumer sales and missing out on the lucrative industrial market. So last May, as other companies were sacrificing their Internet initiatives to the angry gods of the stock exchange and the bottom line, TruServ launched its customized Internet catalogs, allowing store owners to market themselves to large companies. TruServ provides the back-end order-taking and fulfillment capabilities (powered by Net Warehouse, an online ordering application the company spent $1 million to develop); store owners handle the marketing of the site and provide customized pricing schemes and homepages for each corporate customer. To date, 150 out of 7,638 True Value stores have signed on to the program.

One store in Warren, N.J., Warrenville Hardware, has already saved a large corporate account by using the online catalogs, says the store's owner, Bill MacDonald. MacDonald believes that his shop would have lost a $1 million contract with Murray Hill, N.J.-based Lucent Technologies if he hadn't been able to respond to Lucent's request for an online ordering system. He has also begun offering the service to other corporate customers, such as Chubb & Son, an international insurance provider based in Warren. "The catalogs help us keep business and increase business," MacDonald says.

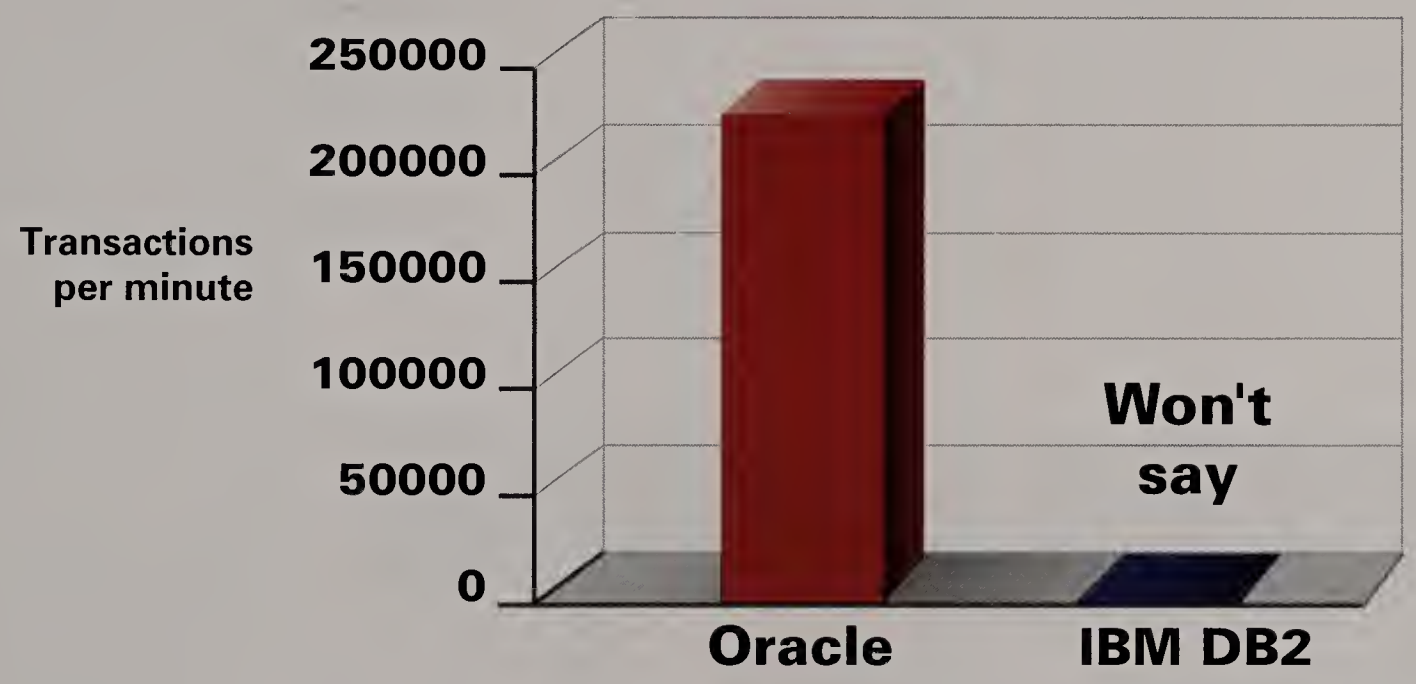
TruServ implemented this project even while CIO Neil Hastie's budget dropped from $58 million in December 1999 to $34 million this year. Hastie's response has been to streamline his software development process. He instituted a quality control program in which IT employees reviewed every step of the development process before executing it. So rather than building something and spending an average of 23 man-hours per day to fix it, as was previously the case, Hastie says his staff now spends an average of one hour per day debugging software that has been carefully reviewed throughout its development cycle.

"The quality is built in throughout the development life cycle," says Hastie, who spent 18 years at Fel-Pro in Skokie, Ill., which was purchased in 1989 by Southfield, Mich.-based Federal-Mogul Corp., an auto industry supplier. "We build quality in to the process, not at the endgame."

Hastie also reduced costs by letting his staff shrink and killing lifeless projects. He pulled the plug on a data warehouse for a

PHOTO BY LEWIS TOBY

What's the fastest database on IBM's fastest computer?



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customer service application that was soaking up resources but that no one was using. He says he's overseen a staff reduction of 35 percent to 40 percent since he arrived.

Sometimes, hard times leave you no choice.

HOW DOLLAR RENT A CAR FINDS NEW CUSTOMERS

When the economy goes sour, businesses begin trimming expenses and cutting perks. Perks like corporate travel—and rental cars.

Beginning in January 2001, Dollar Rent A Car Systems of Tulsa, Okla., invested $200,000 in a new application that would allow the company to take reservations directly from airline websites and from PDAs. The company worked with Dallas-based Southwest Airlines to develop an application based on a technology called Simple Object Application Protocol, or SOAP. The application would let Dollar customers reserve Dollar cars on Southwest's website without requiring heroic integration efforts or asking Southwest to adopt any new technology of its own. Dollar launched the program with Southwest Airlines in May after having initiated its first wireless reservations process, also based on SOAP, in February. Since then, the company has seen a small sales increase from wireless reservations. But Larry Zucker, Dollar's executive director of application development, believes the Southwest deal will ultimately bring up to $10 million in new revenue to the company because in one click it transforms Southwest customers into Dollar customers.

SINCE 1994, DOLLAR has had five programmers and programmer analysts on its 130-person IT staff who do nothing but look for innovative ways to use and develop technology.

Since 1994, Dollar has had five programmers and programmer analysts on its 130-person IT staff who do nothing but look for innovative ways to use and develop technology. Those programmers build prototypes of innovative applications—a recent example is an XML interface to be used as a common protocol to link the disparate data formats used by tour operators—and pass those prototypes on to Dollar's IT developers, who build them in to workable systems. Zucker says he has had to sacrifice hiring employees for other IT duties such as service and support in order to maintain his innovation team. Again, as is the case with his peers at 3M, FedEx and TruServ, Zucker has upper management support for placing innovation over service on his daily to-do list.

When Zucker looks at today's gloomy economic weather, he sees an opportunity to get a jump on his competition. "Dollar has been very committed to making sure that we not just keep up with what's been going on in the industry, but that we try to get ahead," he says. "If we fall behind, we get left in the dust." CIO

Dollar Rent A Car Executive Director of Application Development Larry Zucker: *"If we fall behind, we get left in the dust."*

PHOTO BY RALPH COLE

How are you innovating in tight times? Tell us at *letters@cio.com*. Lee Pender is a Paris-based writer.

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Innovative Product Development

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TWIST AND SPOUT

How could International Paper save its paper container market when everyone was going to plastic bottles with screw caps? Time to get creative.

BY BEN WORTHEN

Photography by Jeff Sciortino

PICTURE A KID EATING HIS SCHOOL LUNCH OR a lazy bachelor at the refrigerator. The tear-and-fold paper carton is inseparable from these images, whether it's a child washing down tater-tots or a grown man drinking straight out of the container. Yet for a while, the gable-top container, like the slide-rule and eight-track tape, seemed destined for Americana—a product from an earlier time. Why? To quote *The Graduate*, "One word: *plastics*."

By the mid-1980s, plastic milk and juice bottles were steadily taking market share from their paper cousins. Stamford, Conn.-based International Paper (IP), one of the country's leading paper carton manufacturers, knew it had to fight to save one of its core products from extinction. The now-ubiquitous Spout-Pak, the official moniker for that little plastic screw cap on the side of juice carton tops, was the result of that fight.

The Spout-Pak has been successful beyond IP's wildest dreams. When the development team first pitched the idea in 1986, it projected annual sales of 50 million Spout-Pak cartons. Today, IP sells approximately 2 billion every year. Still, the development process was humbling. The team overcame initial failures, internal strife and reluctant customers. The company succeeded because it kept customer needs and manufacturing realities in mind, and most important, it accepted the lessons the market taught it along the way.

After **Research Scientist Rod Kalberer** *got his marching orders to save the gable-top carton, he led the team that developed the now ubiquitous Spout-Pak.*

Innovative Product Development

ENDANGERED SPECIES

Research Scientist Rod Kalberer had been at IP less than a year in 1985 when his marching orders came down from Vice President of Liquid Packaging Division Jack O'Brien: Save the gable-top carton. He didn't receive much more direction than that.

Kalberer teamed up with two other R&D men—Bruce Thoman and the since-retired Bob Gordon. Their charge was to reverse the decade-long trend of decreasing gable-top container sales.

Despite the paper carton slump, IP was still the market leader simply because gable-top production and packaging equipment had been in place for decades and beverage packagers were loath to spend money on alterations. This gave the IP development team both an opportunity and its first project parameter: Any changes had to be cheap.

The Pachin-Pak, *the team's first effort, was a flop, but it inspired the ultimate solution.*

"Finding a solution that you can also manufacture is the biggest challenge," says Kalberer. Ninety percent of any manufacturing changes would have to happen in IP's factories so as not to slow down the filling process in dairies and juice plants.

Gordon sought inspiration in niche packaging markets throughout Europe and Asia. He found that some high-end Japanese sake packagers were augmenting paper containers with plastic opening devices. Over the next year, Kalberer and Gordon developed a plastic opening tab they could attach to the side of the traditional paper gable-top carton.

That design met the team's manufacturing goals. Since the patch was only a couple of millimeters thick, it could be attached to cartons in IP's factories. The cartons could be shipped flat, assembled and run through a dairy or juice maker's fill line with little disruption. While the rest of the divisional board was lukewarm on the project, the team came armed with enough positive focus group feedback and had addressed the manufacturing concerns adequately enough to secure funding for a test rollout of the new package design. By 1987, the Pachin-Pak was ready for test marketing in Japan.

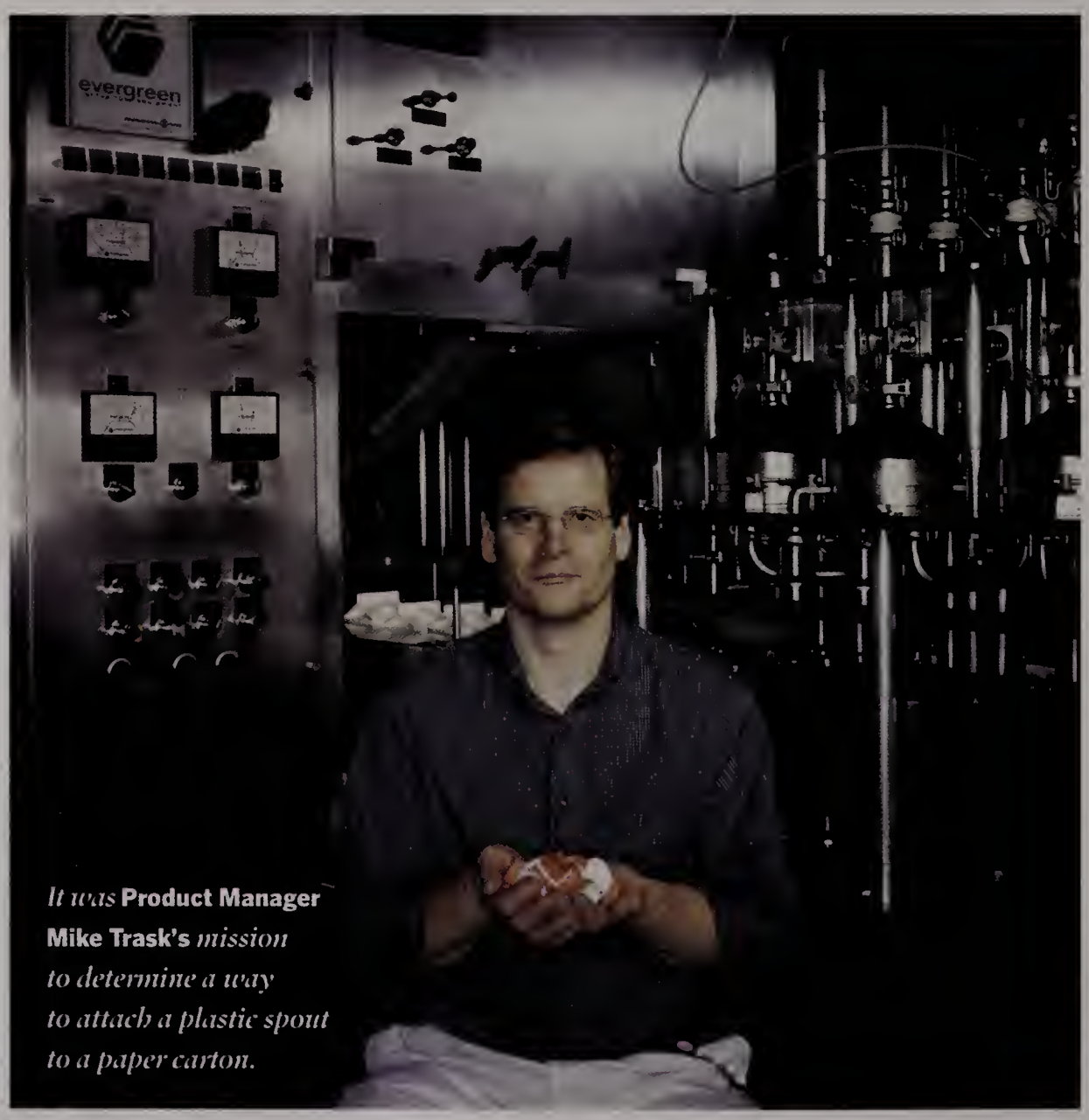
MARKET CAP

The original goal of the market test was to move a million cartons the first month. "We sold 10 at least," Thoman says. The rest sat on the shelves.

"We thought the Pachin-Pak would be a showstopper because it was very inexpensive," Kalberer says. They were wrong. After a year of extensive interviews with food packagers and reading customer surveys, the message was brutally clear.

"They all said it was a good idea, but give me the whole screw cap so I can shake it," Thoman says. Consumers also said they would pay extra for such a device. While that may seem obvious in retrospect, it was a revelation to a commodity company servicing a commodity industry. The initial feedback from juice and dairy packagers had been that innovation was acceptable only if the cost was minimal. IP's customer data challenged that basic notion.

The development group immediately rekindled an idea that had been dismissed earlier because of cost—an injection-molded screw cap glued to the side of the carton. The concept was an immediate success in focus groups. "We literally had people jump up and down," says Thoman.



It was **Product Manager Mike Trask's** *mission to determine a way to attach a plastic spout to a paper carton.*

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Innovative Product Development

After a three-month investigation of more than a dozen potential spout makers, Gordon approached West Pharmaceutical Services (formerly West Co.), a Lionville, Pa.-based manufacturer that already made the appropriate-size caps (a built-in cost savings) and required the same sterile environment as beverage packaging.

One major manufacturing issue remained unresolved. Since late 1988, Kalberer and Mike Trask, gable-top product manager for filling-equipment manufacturer Cherry Burrell in Cedar Rapids, Iowa, had been trying to determine how to attach a plastic spout to a paper carton, then how to retrofit existing filling equipment. After much trial and error, Kalberer attached the spout with ultrasonic vibrations that converted electrical energy into mechanical energy in a fraction of a second. Trask describes it less technically as "mashing up the molecules of the coating and the plastic and welding them together."

That was the easy part. The existing 20-foot-by-7-foot filling machines formed the bottom, applied the spout closure, filled the carton with product and sealed the top. Each machine filled 100 to 140 cartons per minute. Kalberer and Trask had to add the fourth step of attaching the plastic spout without diminishing line speed. However, the final cost of the retrofit was high—about one-third to one-half the original cost of the machines.

IP's new design *had to be inexpensive and had to work with existing filling equipment.*

STILL CHANGING

By the end of 1990, the first Spout-Pak cartons hit supermarket shelves. It was an immediate success. Right away, new orders came in from companies that had initially resisted the idea. In 1991, IP bought the packaging equipment division of Cherry Burrell, renaming it Evergreen Packaging Equipment.

Bringing a product to market is only the start, Kalberer says. As other companies design plastic spout solutions, IP must continue to innovate. The purchase of Evergreen helped, as IP is the only carton manufacturer that owns filling machinery.

The product continues to evolve as well. Throughout the 1990s, IP introduced different size containers to complement the original half-gallon size. In 1995, it attached the spout closure to the inside of the carton instead of the top, producing a better seal and allowing the juice inside to be pasteurized at a higher temperature for better freshness. In 1997, a plastic pull-ring replaced the original foil cover for an easier-to-open carton.

With each of these upgrades, says Kalberer, engineering teams found ways to eliminate equipment retrofitting costs. While the Spout-Pak has revitalized gable-top sales, the paper carton is still losing ground to the plastic container, albeit at a much slower rate. The biggest reason is the dairy market. Most organic and soy milk producers have turned to the Spout-Pak, but dairies still see milk as a price-only commodity. IP's next challenge is to market the Spout-Pak to dairies. The company is championing a dairy spout called the Fresh-Cap, although Product Manager Chris Reilly admits it is essentially the same product with a different name.

The Spout-Pak is helped by inroads it made in the market 10 years ago, Kalberer says, but is still succeeding only because "we continue to look at what features are important and for attributes that simplify or enhance the manufacturing process." CIO

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SPOUT OFF

The first few days of the Spout-Pak's life were nearly disastrous

Every product launch has its disaster, and the Spout-Pak was no exception. The spouts were tested repeatedly in the factories of West Pharmaceutical Services in Lionville, Pa., and Stamford, Conn.-based International Paper (IP), and they worked perfectly every time. Beverage packagers, which had spent months promoting their new cartons with spouts, were getting ready to run the equipment in their filling plants for the first time, but a funny thing happened on the first day. "The spouts kept falling off," says Mike Trask, product manager at Cherry Burrell. "It worked fine in our factory, and all of a sudden we have 10 of these systems in place, and the spouts won't stay on."

The problem was eventually traced to a type of varnish used by a paper stock production plant that had not been part of the smaller trial runs. Within two months, engineers from IP and Cherry Burrell completely reengineered the ultrasonic waves that attached the spouts to the paper cartons, and the crisis was over. ***–B. Worthen***

Staff Writer Ben Worthen likes the Spout-Pak because it makes it easier to drink right from the carton. Send him your stories of product innovation and bachelor behavior at *bworthen@cio.com*.

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Innovative Business Processes

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Jose Luis Luna, CIO
Lorenzo H. Zambrano, Chairman and CEO
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Employees: 24,000

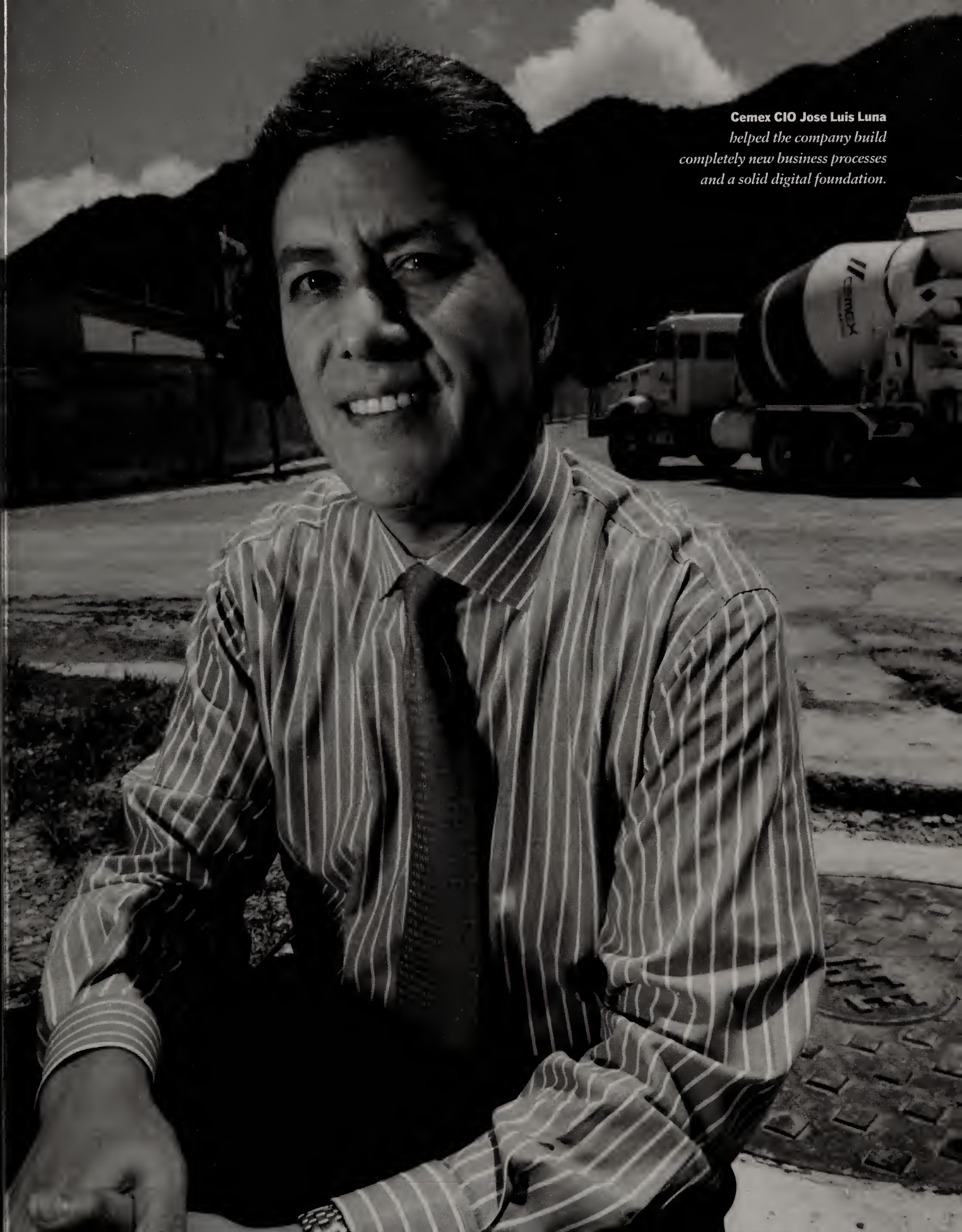
CONCRETE IDEAS

Even an old-line company can be innovative when it comes to business process redesign. Here's how a Mexican cement company learned how to plan for the unpredictable.

BY SIMONE KAPLAN

Photography by Steve Rawls

YOU WOULDN'T EXPECT TO FIND A CEMENT company in the pantheon of innovation superheroes—shoulder-to-shoulder with those who created plastic, fiber optics and Post-it notes. There are few industries more basic or old economy than cement. Like Clark Kent's Superman though, the cement industry has an alter ego that has shed its gray three-piece suit and can leap outdated business practices in a single bound. That alter ego is Cemex, a nearly 100-year-old multinational cement corporation based in Monterrey, Mexico. During the past 16 years, it has completely changed the processes by which cement companies communicate with and deliver to their customers. The company based its process redesign on three components: a satellite communications system called Cemexnet; an overhaul of its tracking,



Cemex CIO Jose Luis Luna
helped the company build completely new business processes and a solid digital foundation.

scheduling and routing system known as Dynamic Synchronization of Operations; and a digital global initiative that links worldwide offices via the Internet.

If you had taken a snapshot of Cemex in 1984, it would have looked like any other regional cement company. Cemex had six autonomous plants that rarely communicated with each other. Managing the network of mixing plants and delivery trucks was a nightmare. Weather, traffic and labor problems caused almost half of Cemex's customers to change their orders, usually close to the originally scheduled delivery time.

From Cemex's command center, CIO Jose Luis Luna can track and reroute delivery trucks.

As a result, Cemex couldn't give customers a definite delivery time. It could only say that the concrete would arrive within a three-hour window. This cost customers time and money, but it was standard practice in the industry. Up to that point, no one was able to do any better.

OUT WITH THE OLD

The turnaround began in 1985, when Cemex appointed a new CEO. Lorenzo Zambrano is the grandson of the man who founded Cemex. After working his way up through the ranks of his grandfather's company, he found himself at the helm of a monolithic company struggling with inefficiency and poor customer satisfaction, both caused by an inability to forecast customer demand.

Zambrano began Cemex's makeover at ground zero by changing the fundamental business strategy. In 1987, he hired Gelacio Iniguez as CIO, and the two sat down with the rest of the management team to solve the issues of efficient delivery and unforecastable demand. "At that point, there was no IT department," says Jose Luis Luna, Cemex's current CIO, who joined the company in 1987 as the head of technology development. "Basically, there were a couple of computers that ran accounting programs. We realized that IT needed to be a key part of our new business strategy." Rather than building an IT department concurrently but separate from the ongoing business redesign, Luna and the other Cemex officials focused on fundamental alignment.

Cemex's production and delivery methods weren't serving the company or its customers very well, so the executives looked at how other companies—FedEx, Exxon and the city of Houston's 911 emergency system—handled similar problems successfully. FedEx had created a reliable worldwide delivery system that successfully managed unforecasted demand. Exxon's tracking, scheduling and rerouting system efficiently handled its network of oil tankers and deliveries despite unpredictable weather, market and political conditions. Houston's 911 system had developed a way to dispatch and coordinate emergency vehicles in response to occasionally sketchy information.

NEW FOUNDATION

Because Cemex couldn't change the way its customers work, Zambrano and his IT team changed the way the company handles unpredictability. Dependable, on-time delivery and customer flexibility are at the heart of their business, so they looked to technology and the lessons learned from FedEx, Exxon and Houston to streamline Cemex's processes. "We saw it was almost impossible to deliver information in real-time, and we knew it was time to invest in infrastructure," says Gilberto Garcia, IT planning director at Cemex, who also joined the company in 1987.

They started from the inside out. In 1989, the company developed Cemexnet, a satellite communications system that linked all the cement plants. The company also opened a central office to coordinate its production facilities. Cemexnet made it easier for the plants to remain abreast of supply and demand. It also streamlined the flow of financial information and other back-office functions, which were gradually automated.

Now that the plants could communicate, it was time to deal with the delivery systems. During the early 1990s, Cemex installed a logistics system called Dynamic Synchronization of Operations, which uses GPS technology to link delivery trucks to a central control center. Cemex merged the

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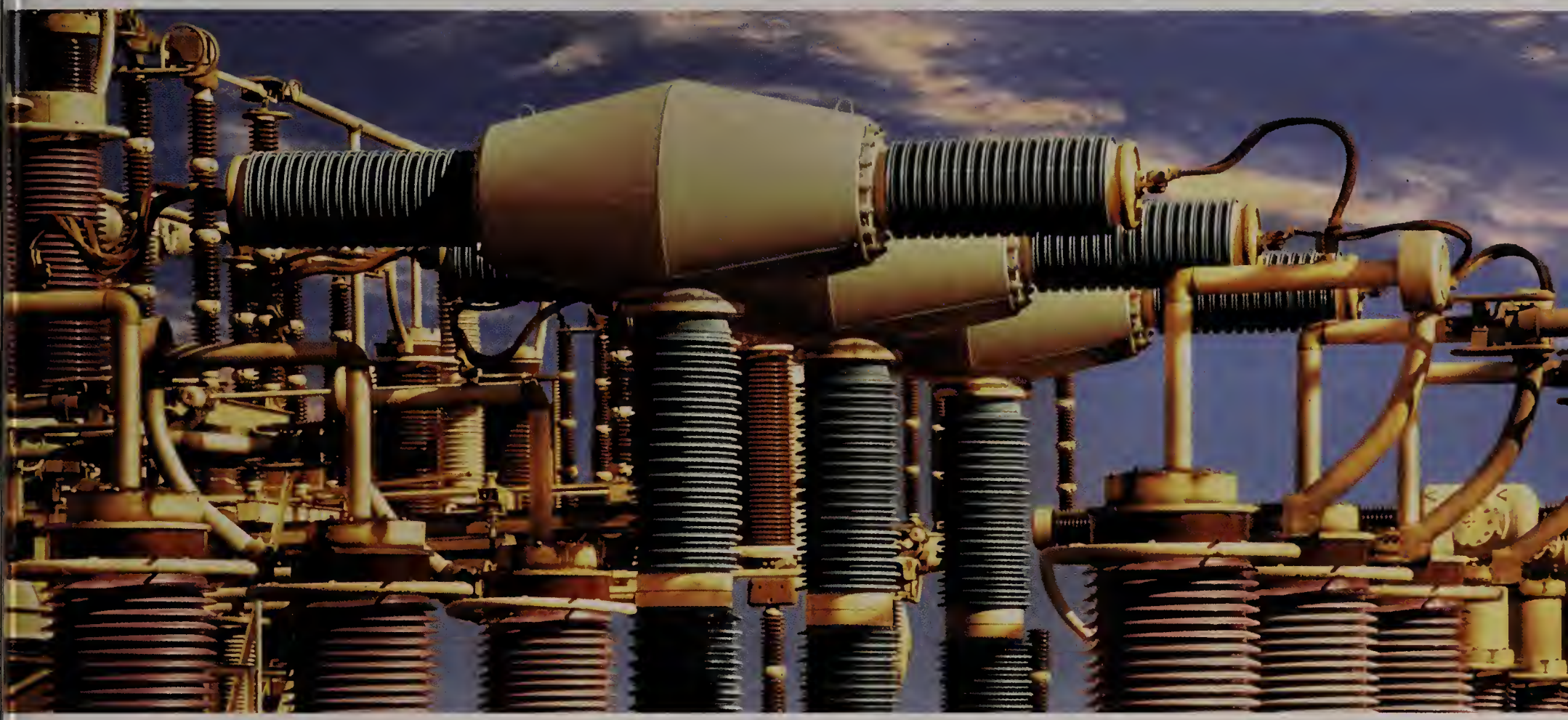

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individual truck fleets and equipped each truck with a computer and a GPS transmitter. Because dispatchers at operations centers in Monterrey, Mexico City and Guadalajara could see the location, speed and direction of each truck, they could make sure deliveries were picked up by the trucks closest to each of the production plants. They also had detailed information on traffic conditions, inventory and the customers' location, so trucks could be rerouted if traffic got too hairy and deliveries could be redirected if a customer's order changed at the last second.

Cemex's global digital program, which began in the late 1990s, is the third piece of the puzzle. It connects each element of Cemex's worldwide operations via satellite and the Internet. An online portal lets Cemex's suppliers, distributors and customers check their order status.

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CEMENT ON DEMAND

These technology initiatives have helped Cemex slash its delivery window from three hours to 20 minutes, dramatically increasing the value to its customers. Cemex makes deliveries within that window 98 percent of the time. Eventually, it aims to cut the 20-minute window in half. Customers can change their orders up to the moment of delivery at no charge, and they get a 5 percent discount if the order is late.

Zambrano's gamble has paid off so far. By the first quarter of 2001, Cemex's net sales increased to $1.6 billion, up 19 percent compared with last year's first quarter. "Our growth has been driven by the fact that we are completely integrated," he says. "It makes us faster and more informed than our competitors."

That business sense is what made the company's redesign innovative, says David Bovet, vice president and coleader of the supply chain management team at Mercer Management Consulting, a global strategic management company. "This is not just a good technology application," Bovet says. "It's a brilliant business design. They have taken the ultimate commodity product and showed that you can achieve differentiation through service. It isn't so much the product or the industry, it's rethinking what the customer wants and how you can respond to it in a way that's economical for the company."

Cemex charges a premium for its services because of the efficiency it offers, though Luna is quick to note that prices are regulated more by the market than by the company. Company executives say Cemex now uses 35 percent fewer delivery trucks than it did before overhauling the system, or "one truck for every two" used by the competition. Luna projects cost savings of $100 million during the next year on fuel, maintenance and payroll. Cutting costs is good for many reasons, not the least of which is that Cemex spent almost $200 million during the past decade on its transformation. It is starting to recoup on that investment, mostly through reduced production costs that Luna attributes to the IT-business redesign.

The challenge now, he says, is to keep updating Cemex's business practices to stay ahead of the game in terms of innovation. "The challenge is to set an innovation process that keeps us ahead of the game in winning customer trust," Luna says. "It's not a matter of who has better technology, it's a question of who does things faster." CIO

How are you developing innovative business processes in your industry? Tell Staff Writer Simone Kaplan what they are at *skaplan@cio.com*.

REBUILDING CEMEX

Cemex built its digital foundation step by step

1906 Founded as Cementos Hidalgo.

1931 The company's production plants in Hidalgo and Monterrey, Mexico, come together to form Cementos Mexicanos, or Cemex.

1976 Goes public on the Mexican stock exchange; now has eight plants.

1984 Lorenzo Zambrano becomes CEO.

1989 Initiates Cemexnet program, which links all of its production plants via satellite.

1992 Goes international by acquiring Spain's top two cement companies.

1993 Installs a logistics system called Dynamic Synchronization of Operations, which links each delivery truck with a central command center.

1994 Expands into Venezuela.

1998 Installs its digital global initiative, connecting offices around the world via satellite and a corporate portal.

1999 Company now has plants and operations in Colombia, Costa Rica, Dominican Republic, Indonesia, Panama and the Philippines.

1999 Opens on the New York Stock Exchange.

2000 Launches CXNetworks, an IT subsidiary.

2000 Cemex and four other Latin American IT companies form Neoris, an e-consultancy focusing on Latin America and Europe.

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Scott Lutz, President and CEO
Anna Miskovsky, Director of R&D
www.8thcontinent.com
Revenues: NA
Employees: 17

What was unexpected to those involved in the talks is what didn't

GOT SOY

In a unique union, two old-establishment giants design 8th Continent—a maker of soy milk—to be small and radical

BY STEWART L. DECK

Photograph by Per Breiehagen

THE RESULT OF NINE MONTHS OF TALKS BETWEEN General Mills and DuPont surprised even those involved. The two industry giants, with almost three centuries of business traditions behind them, last September created 8th Continent, a joint venture designed to speed new soy-based products to market while remaining nimble enough to respond to an exploding demand for health foods.

What was unexpected to those involved in the talks is what didn't happen: a straightforward purchase or licensing pact, or a deal under which General Mills could buy and use DuPont's soy isolates. General Mills, for one, had swung plenty of such agreements, and one of them (an international cereal strategic alliance with Nestlé) is hugely successful. From the start, though, the vision for 8th Continent was different. This would be a lasting relationship, with both sides contributing people and resources to their corporate child—$40 million for the first two-and-a-half years. And yet the child, quite on purpose, would be markedly different from its parents. 8th Continent would remain small. It would avoid the stodgy, bureaucratic levels of decision making familiar to General Mills and DuPont. It would move quickly, with an emphasis on creativity.

The managers of 8th Continent would act like upstarts, says its 42-year-old president and CEO, Scott Lutz. "I have to get these big companies to allow us to be daring and to respond to market conditions and changes quickly and flexibly," says Lutz. "I'm supposed to act as a corporate revolutionary and push both sides hard." Some companies wouldn't allow this, Lutz adds. "They'd get scared and veto our ideas and bog us down, but both General Mills and DuPont

Scott Lutz, president and CEO of 8th Continent, *pours his all into making the soy milk maker more agile than parent companies General Mills and DuPont. "I have to walk a fine line between being courageous and being stupid," he says.*

Innovative Relationships

Danny Strickland, a General Mills executive for innovation technology, *put the call out to chemical experts at DuPont...*

... where **General Manager J. Erik Fyrwald** *saw 8th Continent as a way to build excitement and profits.*

have been quite tolerant. Even so, I have to be careful and pick my battles. If I push too hard and too fast, people will entrench and I won't get anywhere. I sometimes have to walk the fine line between being courageous and being stupid."

No one would think of calling Lutz stupid. High-energy, yes—both in his career and in his intense manner of speaking, the way he launches words and ideas at you. Innovative, you bet. Before joining General Mills 10 years ago, Lutz dreamed up the Tide Racing Team for Procter & Gamble in the mid-1980s. Later, he led the General Mills creative team that in 1995 developed eat-on-the-fly GoGurt. Eighteen months ago, his group launched Milk 'n Cereal bars, a product that has grown into a $100 million business. This latest project, 8th Continent soy milk, was due to hit grocery shelves this July. The result of an innovative partnership, 8th Continent impressed judges to make it a CIO-100 honoree.

FORGET THE PLASTIC CEREAL JOKES

While 8th Continent represents a new kind of culture, it doesn't signify a departure from its corporate parents' due diligence practices. (Recall those nine months of meetings.) Minneapolis-based General Mills, known for Wheaties and other long-established breakfast cereals along with Betty Crocker cake mixes and Yoplait and Columbo yogurts, also uses its R&D wing to explore new products and markets.

Jim Lawrence, CFO at General Mills, recalls sitting in on several meetings in mid-1999 when a ventures group suggested the company explore the idea of entering the soy beverage market. The impetus was clear: While the food industry overall grows about 2 percent or 3 percent per year, wellness foods, such as soy products, showed the potential to grow 10 percent or 20 percent annually, according to the Hartman Group, a Bellevue, Wash.-based market research company. More research showed that many consumers were interested in the idea of soy milk but were far from loyal to any brands that were currently on the market. If a new, better tasting soy milk came along it could gain wide acceptance. That was a key condition, Lawrence says. "In new ventures like this you want to offer a better, differentiated product that has a good chance to be a category leader. It isn't very attractive to be number four or number five in a new market. You get into it to be one of the top two products."

The call then went out from Minneapolis to Wilmington, Del.-based chemical maker DuPont, says Danny Strickland, senior vice president of innovation technology and quality at General Mills. The talks that led to 8th Continent's founding began, with both sides recognizing the other's strength.

Innovation Facts

One serving of 8th Continent soy milk includes one part DuPont, one part General Mills and no bureaucracy

DuPont	Established in 1802
2000 revenues	**$28.3 billion**
Provides the soy isolate formula	**100%**
General Mills	Established in 1928
2001 revenues	**$7.1 billion**
Provides marketing, brand awareness expertise and product manufacturing	**100%**
8th Continent Headquarters	Minnetonka, Minn.
IT Support	Run by General Mills with some DuPont assistance
Established	September 2000
Employees	17
Board of Directors	cochaired by DuPont and General Mills
First Product	8th Continent soy milk
due out	July 2001

PHOTO LEFT BY PER BREIEHAGEN; RIGHT BY JIM GRAHAM

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Innovative Relationships

J. Erik Fyrwald, DuPont's nutrition and health vice president and general manager, says his company needed expertise in connecting with consumers entering a market with tremendous growth potential. Strickland adds that the parties saw they would be stronger together in what was for them new turf. "Sometimes you go into an opportunity knowing it's an opportunity, but you can't predict every twist and turn in the market in advance, so you make sure you have a solid base of competence," he says.

8TH CONTINENT is an experiment in reinvention—more about changing culture than making soy milk.

SOY CULTURES

The deal set up 8th Continent as a 50-50 partnership. DuPont and General Mills would each provide half the new company's staff of about 20 and half the startup seed money. The partners would halve the profits. "If they're set up the right way, joint ventures have the advantage of being more nimble than their parents. We hope that's the case here," says General Mills' Strickland. "This one has the resources and the strengths of its parents with the ability to be quick and adaptive in the marketplace."

That's the theory behind the organizational model, certainly. Carrying it out, creating the work environment necessary to make 8th Continent a success will be the big challenge, says Richard Leider, founder of The Inventure Group, a Minneapolis-based corporate leadership consultancy. Leider has worked with 8th Continent's Lutz on management practices. "This is less about soy and more about culture," Leider says. "It's an experiment in reinvention. How does a corporation reinvent itself and its talent to be more competitive in a new economy? That's what's happening here."

Finding those answers takes a clear-eyed view of 8th Continent's situation, Lutz says. As he sees it, mapping out sales and marketing plans and leading his group are easy compared with his overarching mission to push back against two enormous and established bureaucracies and teach them both about entrepreneurial philosophy. And while 8th Continent gains management experience from its DuPont- and General Mills-appointed board of directors, neither company is widely seen as having entrepreneurial incubation experience. "A lot of the great General Mills [sales and marketing] fundamentals apply very well to what we're trying to do, but because we're developing new plans for markets with low [consumer] penetration, some of the traditional approaches don't work as well," Lutz says. (One notable victory: The company's name, 8th Continent, refers to a new-age concept describing one's physical health and well-being. The name stuck in spite of early protests from the corporate parents, Lutz says.)

Two entrenched bureaucratic organizations gave 8th Continent its mandate to create "an entrepreneurial team out of people who have been very good at working within their bureaucracies," says Leider. In addition, Leider says, Lutz and his team are "supposed to lead in an entrepreneurial environment, one that requires imagination and speed, which is completely counterintuitive to both mother ships. Historically, bureaucracies don't foster entrepreneurs, they *kill* them." What Lutz has going for him, says Leider, is that "he isn't a prototypic management type. He moves fast and is willing to make as many mistakes as he needs to in order to learn and find business patterns that will work."

The corporate parents say they understand the job of Lutz and his team is to make waves, to get things moving. "In these big companies we have a lot of things to work on every day," says DuPont's Fyrwald. "Cutting through that clutter and getting our attention and getting us to feel the excitement is something Scott [Lutz] does particularly well."

In trying to do something new, 8th Continent faces a familiar swim-against-the-current challenge, says George Abide, president of The Abide Idea Co. in Minneapolis. Abide assisted 8th Continent with its launch. Innovators "are constantly being told, 'That's wrong' or 'That's not how we do things' or 'That's not protocol.' But discomfort is the sign of innovation," he adds.

One other important 8th Continent quality is that it will keep its mother ship ties. General Mills' Lawrence says 8th Continent must provide repatriation for its employees who went to the startup and gave up a clear shot at management. These workers need to return to their careers at General Mills and DuPont, something Lawrence says the companies are working on.

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Lutz says time will sort out issues like that one, but he doesn't expect every question will have a clear resolution. "I can really never imagine a day when the two companies, General Mills and DuPont, will be harmoniously aligned on everything. That would be naive, and frankly it might not be healthy."

And healthy is where this all began. CIO

Stewart Deck *(sdeck@cio.com)* is eager to hear your thoughts about this story.

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QUICK CHANGE ARTISTS

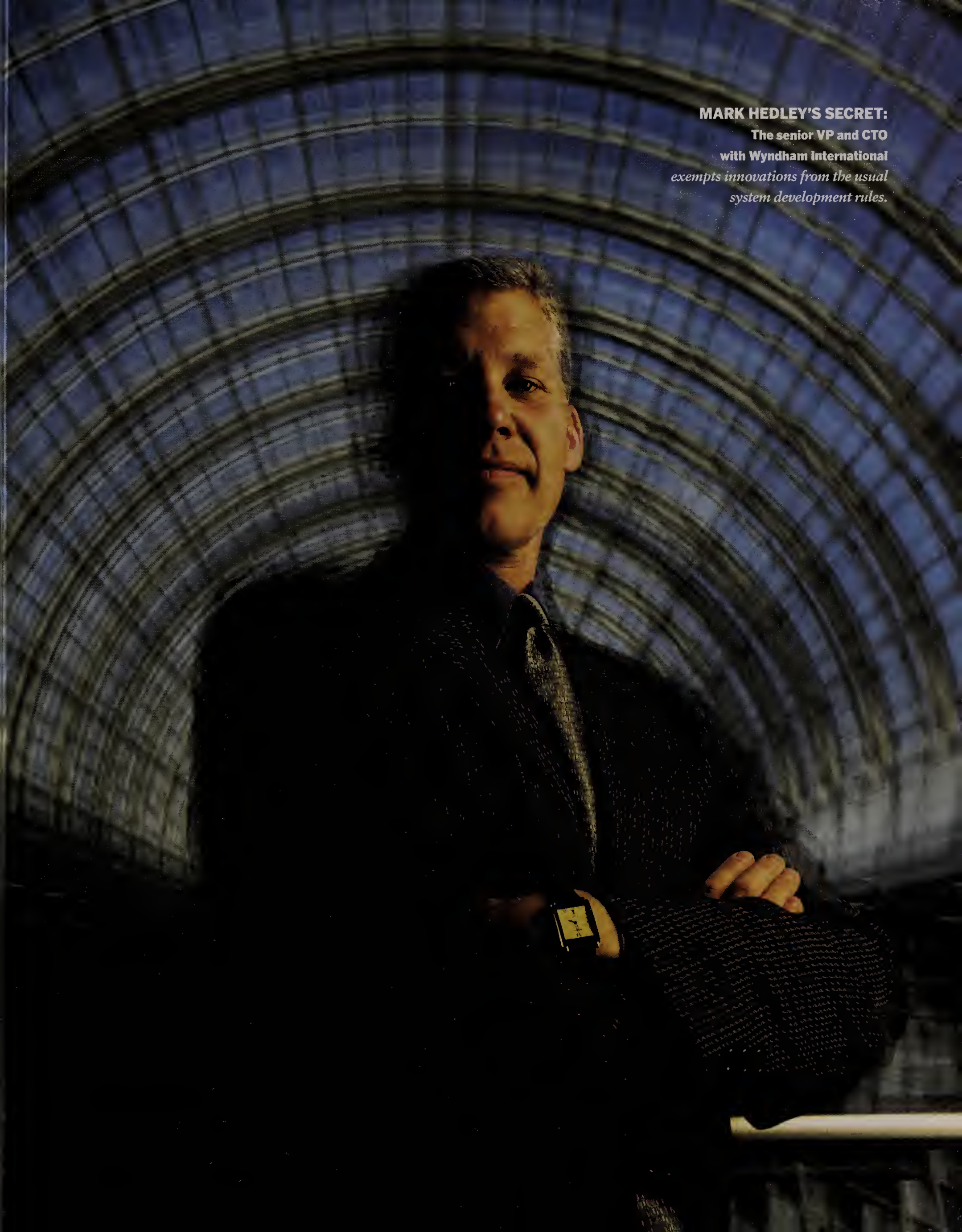
Short on time? Here are seven secrets for innovating in a hurry.

BY STEPHANIE OVERBY

Photograph by Danny Turner

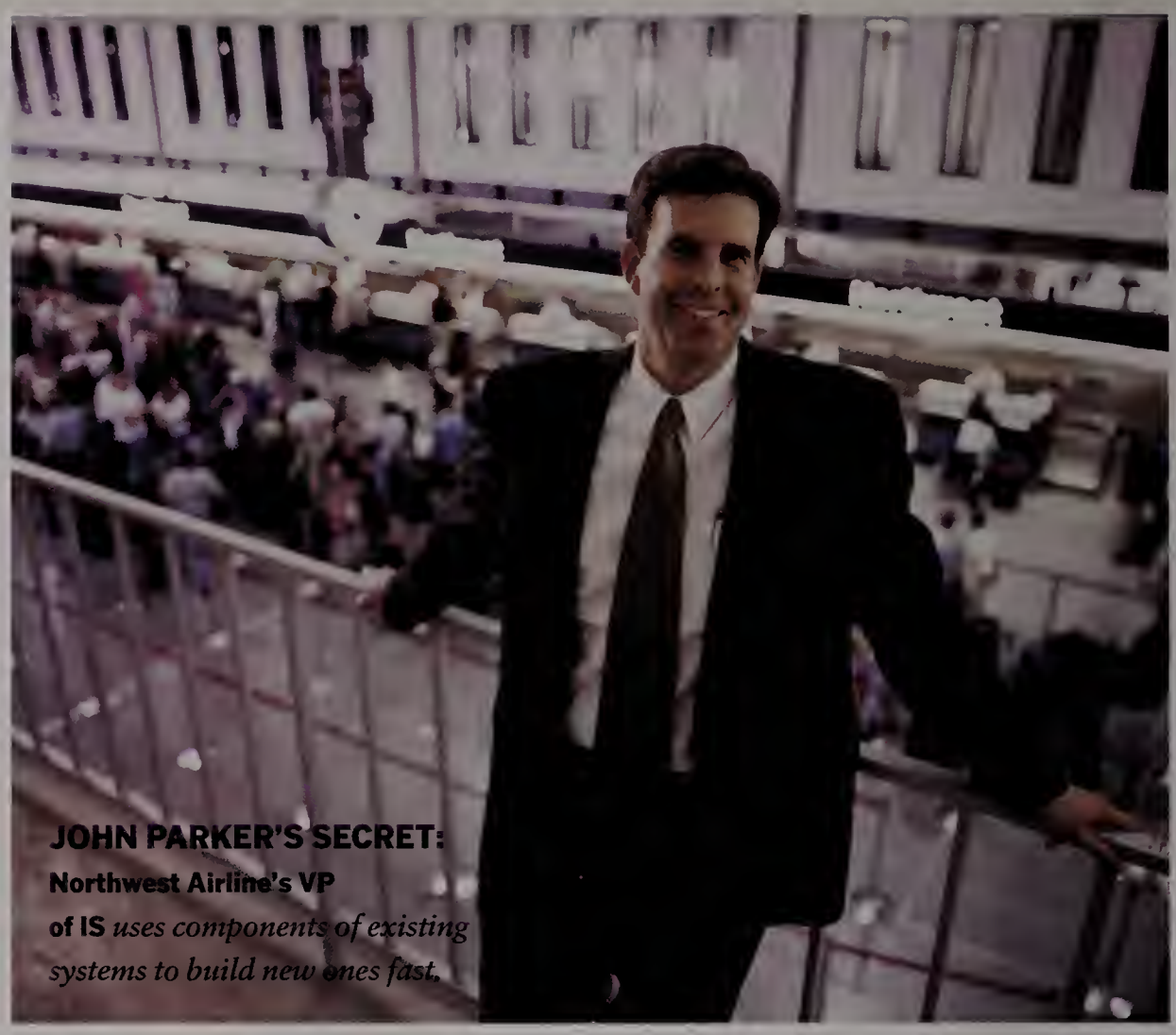
LORAL WERNER CAN FINALLY LAUGH WHEN SHE THINKS about last Dec. 15. As vice president of applications and development at Dallas-based Wyndham International, she was working on an application that would provide wireless access to Wyndham ByRequest, the hotel chain's website for frequent guests. The project looked promising, but Werner wasn't close to rolling it out. She was aiming for a relaunch of the site on Jan. 15. That's when Senior Vice President and CTO Mark Hedley suggested that Werner's team launch the wireless application at the same time. "We got a good chuckle out of it," Werner remembers. "But Mark wasn't laughing."

Hedley knew being quick to market with wireless services would help Wyndham compete against other hotel chains, and he had promised the company's chairman he would meet the deadline. Werner's team delivered the application on time, which lets customers book rooms and manage their accounts using wireless devices. Meanwhile, in the software development process, Hedley and his team learned valuable lessons about how to manage fast-track innovations. For instance, if Werner (who left Wyndham in May when her job was eliminated in a corporate restructuring and at press time was seeking a CIO position) could do the project again, she'd prefer not to work against a moving target—every change to the website required that the wireless application change too—and she would demand a full three months to work.



MARK HEDLEY'S SECRET:
The senior VP and CTO with Wyndham International *exempts innovations from the usual system development rules.*

Best Practices



JOHN PARKER'S SECRET: **Northwest Airline's VP of IS** *uses components of existing systems to build new ones fast.*

"It was completely insane," Hedley admits.

But Wyndham is still sold on innovating quickly. So are fellow CIO-100 honorees Northwest Airlines and Charles Schwab, companies where fast-track innovations are mandatory. They've found that when executed well, fast-track IT innovations—done in 90 days or less—are more likely to succeed than long-term projects. Fast-tracking makes the scope of the innovation manageable and produces greater returns, says Scott Nelson, vice president and research director at Gartner in San Jose, Calif. And when the right innovations are sped to deployment, the results spread beyond the innovation itself. Companies get better at managing every IT project and achieve greater alignment with business partners.

Successful fast-track innovation begins with good project management practices. But "innovating on a fast track goes beyond that, to knowing the business and the people you work with," explains John Parker, vice president of information services for Northwest Airlines in Eagan, Minn. "We have to be able to run good projects, but we can't get innovation unless we translate business objectives into good technical solutions."

You can put innovation on the fast track at your company by following these seven tips from CIOs who are experts at speed.

THE BEST innovations to accelerate for delivery are projects that are already under way or that build on existing architecture.

PICK THE RIGHT PROJECTS

The best innovations to accelerate for delivery are those already under way or ones that build on existing architecture. That's why Northwest chose self-service check-in for its first rapid IT innovation. Parker insisted on quarterly innovations when he agreed to head an airport innovation team in 1999. Airport management costs were rising, and the company needed quick results. E-service centers for the terminals were already in development, and Parker delivered them ahead of schedule. "We could have built something new or done what we did, which was to take something we were already working on and refocus and reenergize it. That had the most value and was the most doable," Parker explains. In the first quarter of 2001, the project enabled 1 million automated check-ins, the equivalent of about 150 DC-9 jets a week.

At San Francisco-based Schwab, IT executives speed to market innovations that have clear benefits for customers. Schwab knew that its most active traders—customers trading at least 120 times a year—wanted to be able to get the same stock prices that institutional traders do. So last December, Paul Gaffney, the company's senior vice president of technology, strategy and architecture, put this capability on the fast track. StreetSmart Pro, a trading platform that enables direct trades with a stock exchange, went live in March. Gaffney was able to get the project done quickly using software developed by a company Schwab had just acquired.

Fast-track proponents also break large innovations into 90-day nuggets, a principle that derives from good project management practices. Schwab's Dawn Lepore, who is CIO, vice chairman and executive vice president, says this approach lets Schwab get customer feedback and it boosts staff morale.

But chunking up long-term projects may not always be appropriate. Infrastructure-related innovations fall into that category. "If you're pioneering a new way of doing business, chunking it up makes an enormous amount of sense," says Michael Treacy, chief strategist and cofounder of Gen3 Partners, a Boston-based business consultancy. "But a series of 90-day projects can result in a poorly architected system. Undoubtedly you change your opinion of what you want by doing it in a modular fashion, and it could potentially be more expensive to build."

PHOTO BY STEVE NEIDORF

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Best Practices

BE A SCAVENGER

Northwest's next innovation—portable workstations that free gate agents from their desks when checking in passengers—wasn't a new concept. The idea had been kicked around since the early '90s. Late in the summer of 1999, Parker finally found a way to do it—his group would adapt an existing system. He had discovered that the maintenance department was certifying a wearable computer for recording nonroutine maintenance needs. "They had a product that had been battle tested. We knew we had a solution if our gate agents would be comfortable wearing it," Parker recalls. Northwest ran the devices on a radio frequency network it already had in its terminals and modified a PC-based airport productivity tool as front-end software. Parker and his team rolled out the workstations in Northwest's Minneapolis hub in time for the 1999 holiday travel season and later deployed them in other airports.

In April, Parker and his team completed another fast innovation reusing the same radio frequency network and wearable computer technology. A new scanning device, called Safetrac, allows Northwest employees to tally the weight of cargo and baggage as they are loaded on the aircraft by reading the data off bar codes, rather than recording it manually. Weight counts are done more quickly and accurately, which means planes use less fuel and spend less time at the gate. "Reusability is a huge part of [fast innovation]," Parker explains. "It's not only the fastest way to innovate but also the most stable and reliable."

At Schwab, "recycle and reuse" is a mantra that helps maintain uniformity across its multichannel business. Customers "expect us to be remarkably consistent, so we tend to use the same systems components in everything we do," Gaffney says. For example, when Schwab adds features to its telephone self-service channel, it makes sure the changes can be replicated for its website and wireless users. Similarly, Schwab built an application that lets foreign customers trade before U.S. markets open for the day by reusing a code it had created for a similar domestic service. Leveraging existing technology may limit the capabilities you offer, but it makes it possible to get new features in place quickly, according to Carolyn Belton, managing director of information technology at Schwab.

DIRK MCMAHON'S SECRET:
Northwest Airline's senior VP of ground operations *keeps IT's feet to the fire by reminding them of their ultimate customer—the public.*

PHOTO BY STEVE NEIDORF

INVOLVE THE BUSINESS

As with any project, involving business partners in setting the parameters of IT innovation ensures that projects line up with company goals and increases the prospect of success. It's crucial when the project means change for your organization.

At Schwab, many facets of the organization foster the day-to-day alignment necessary for fast, frequent IT innovation. Schwab has IT teams that specialize in systems unique to each business unit (such as electronic brokerage and retirement plan services), as well as a group that manages systems used by everyone. While the idea for an innovation often originates in one business unit, Schwab develops key technologies as shared components, forcing collaboration among different units. Within the company, cross-functional efforts at satisfying client needs are widely publicized, according to Gaffney.

At Northwest, constant communication among departments has been critical. When Parker was working on Northwest's new check-in applications, two senior executives from ground operations and marketing on the airport innovation team constantly reminded Parker of their objectives to bust long lines and give customers choices in how they interact with the airline. "We could always answer the question, Does this meet the customers' needs?" says Dirk McMahon, senior vice president of ground operations, who meets monthly with Parker and Al Lenza, vice president of distribution planning and e-commerce. "It was 'we' delivering," Parker adds. "When there were

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DAWN LEPORE'S SECRET:
The CIO, vice chairman and executive VP of Charles Schwab
breaks up large innovations into 90-day nuggets.

In that respect, speedy projects are no different from any other IT system—you have to sell them as investments. Innovations may be risky, says Julie M. Wilson, practice executive and principal at IBM Global Services and board member of the Project Management Institute, but if you break them into phases and demonstrate the value of each part you can prove their value over time.

GET YOUR TEAM ON BOARD

When Hedley made fast-track innovation routine nine months ago, he was also reorganizing his department. In the process, many employees were laid off, and he had the chance to hire others whom he believed were better suited to the new fast-paced environment. The remaining project management staff, who were accustomed to a traditional, rule-bound software development approach, had to adapt to the change. "Some people were just not suited to that type of environment," Hedley says. A change in thinking was the key to getting the staff involved in fast-track innovation. "When I came here there was one thing I couldn't stand to hear: 'That's the way we've always done it.' But a procedure only works as long as it works," he says.

He keeps his staff members motivated by freeing them from other projects when they work on an innovation. "With the wireless project, we had a core team who knew they were going to live, breathe and sleep the wireless project," Werner says. "When you're juggling other things, you lose speed. You need to put blinders on the team to anything else that's going on in the business."

Northwest's Parker also faced resistance

PHOTO BY JENNY THOMAS

any hiccups, the others had so much skin in the game they helped with cleaning up."

SELL THE PROJECT

By definition, innovations move your company into uncharted territory, where it's not always easy to predict a return. And when you fast-track such projects, you may need a big staff and a larger-than-normal budget to make tight deadlines. Emphasizing that fast-track innovations are investments can help. Gartner's Nelson says executives don't always believe that you can achieve large returns in a short time and are reluctant to devote many resources to short-term projects.

For Parker at Northwest, having executives from ground operations and marketing on his airport innovation team was essential in selling fast-track IT innovation. "We had engaged business units that were able to get the right attention and move the right mountains," he explains. "Independently, I'm just an IT guy with some good ideas. But by partnering with them we were a force for business change."

Even then Parker's team had to educate fellow executives about the return from fast-track changes. "It's a pretty tough road to walk with the finance community unless they already understand fast-track innovation. Most companies don't have R&D money just lying around," Parker says. "Sometimes you'd like to say, 'How about if I tell you I don't really know how much we're going to spend? How about you give me $1 million and I'll make $3 million with that, and then we invest more?'"

MOST COMPANIES don't have R&D money lying around, so it's important to sell innovations as investments.

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from the ranks. "What you want to do is seek out the like-minded people in your organization and help them to become your evangelists," says Parker, noting that innovation can be a particularly delicate issue for those who have built the systems you're replacing. Acknowledging that his staff has built a good foundation from which to innovate is one way Parker allows his employees to save face. "As you're changing what they've done, there is a natural resistance," he says. "The easiest way to deal with that is to let them be part of the solution and pull them into the decision-making process."

LOSE THE RULE BOOK

At Wyndham, Hedley decided to streamline his software development practices for fast-track projects. He substituted what Werner calls their "nonmethodology methodology."

Normally, a business analyst would map out system requirements, IT would develop technical specifications, and project managers would determine the resources needed and oversee system development. With the wireless innovation, there were no early system requirements, no technical specs and no project managers. Hedley gave Werner and her team three objectives—make the application convenient for customers, don't create an entirely new architecture, and don't rewrite the Web content—then let them go. "You get these highly skilled technologists in a room and tell them to make this happen. How [they] make it happen is up to [them]. There are no rules," Hedley says.

Letting the IT staff make decisions minus typical business rules was a practical necessity to meet the deadline for the wireless project. "There was no 'Let's wait for tomorrow,'" Werner recalls.

Yet Hedley admits the fast-and-loose approach isn't always appropriate, such as when Wyndham rolled out a new technology infrastructure for its hotels this past January. "Those types of innovation need order because of the amount of people and resources involved," he says. "With the wireless innovation team, it was a very small controlled group with only one mission."

PAUL GAFFNEY'S SECRET: **Charles Schwab's senior VP of technology, strategy and architecture** *makes sure every fast-track project has a backup plan.*

PHOTO BY JAY BLAKESBERG

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HAVE A BACKUP PLAN

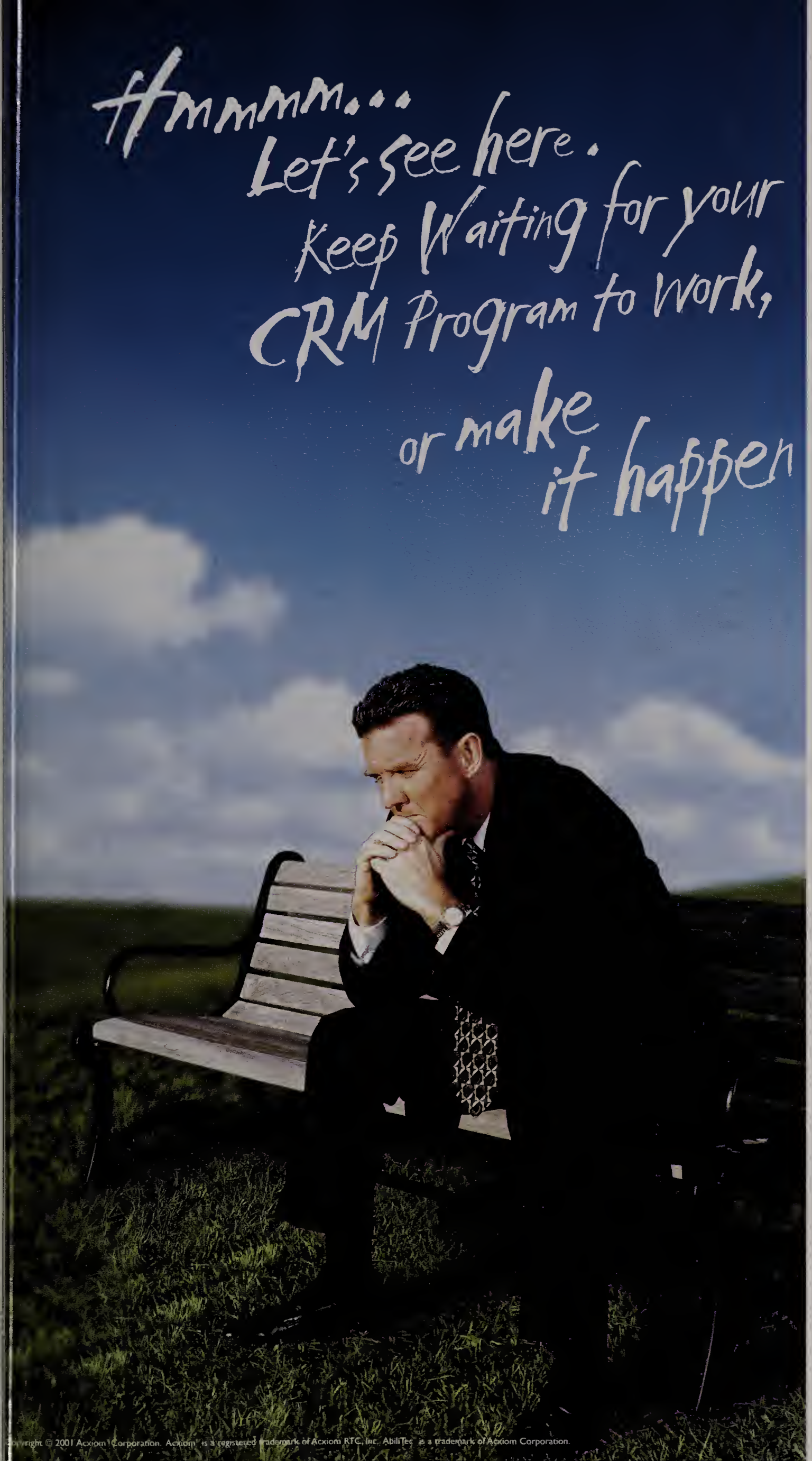
The amount of risk you can manage should determine how fast you can move, says IBM's Wilson. Schwab dedicates an entire unit within IT to risk and reliability assessment and planning. Usually this team focuses on how to reduce the likelihood that a new system will fail.

With fast-track innovations, the team focuses more on failure recovery because preventing meltdowns takes more time. "There is a natural tension between risk mitigation and going fast," says Gaffney. "Often folks who focus on fast-tracking innovation are only focused on getting that deliverable done and not as much on what's going to happen if all the planets don't line up. We strive to balance those contradictory demands."

Managing risk may also mean *not* meeting your deadline. "I'm not such a stickler to a date," Parker says. "I'd rather have an aggressive target and miss by two weeks than have an easier target and beat it."

Sometimes, business executives decide they want to change the scope of a project—because, for example, they need to keep up with something a certain competitor does. "It comes down to either not doing what we want in order to protect some time line or coming in late and over budget because we [have to] accommodate the change," Parker says. "People tend to appreciate that we take the time to stay competitive." CIO

Share your fast-track innovation tips with Senior Writer Stephanie Overby at *soverby@cio.com*.



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STRESSING PERFORMANCE

GREEN LIGHTS

A significant number of the successful companies named to this year's CIO-100 list have also been recognized for leading earth-friendly initiatives. These companies are learning something that may startle those that have not yet edged toward greenness: More and more, profitability and environmental consciousness go hand in hand. And as energy supplies dip and proposed solutions lead to bitter political fights, good green ideas couldn't come at a better time. The following six environmental innovations are ideas you can use from some of our 2001 CIO-100 honorees.

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www.scjohnson.com

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If you're looking for innovative ideas, take a page from these CIO-100 honorees—look to the environment

Don't Wait to Be Told In 1975, S.C. Johnson & Son—maker of familiar household products such as Shout, Windex, Ziploc and Edge—took a radical step and eliminated chlorofluorocarbons (CFCs) from its aerosol cans. It did that three years before CFCs were outlawed in the United States. Such forward thinking saved the company money because it didn't have to scramble to meet regulatory mandates. Since 1990, S.C. Johnson has reduced volatile organic compounds (VOCs) in its U.S.-produced products by 33 percent. When the company moved from a VOC-based to water-based Raid in 1994, the

BY MEG MITCHELL MOORE

Illustrations by Felix Sockwell

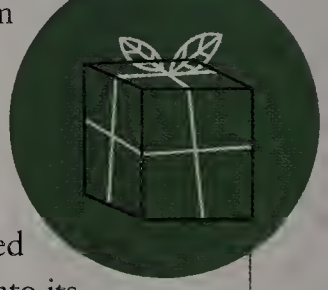
Environment

switch accounted for a 7,500-ton reduction in VOC use—and an annual cost savings of more than $1 million. "We save money when we are reducing bad materials and increasing the use of good ones," says Cynthia Georgeson, director of worldwide corporate public affairs.

> "WE SAVE MONEY when we are reducing bad materials and increasing the use of good ones."
>
> –CYNTHIA GEORGESON, DIRECTOR OF WORLDWIDE CORPORATE PUBLIC AFFAIRS, S.C. JOHNSON & SON

Look for Fresh Answers In 1991, Patagonia—the Ventura, Calif.-based maker of outdoor clothing and climbing equipment—studied its four main fibers (polyester, nylon, cotton and wool) to determine their environmental effects. What it learned about cotton was disturbing: Its production relied heavily on pesticides, herbicides, chemical fertilizers and defoliants. "Cotton has a huge negative environmental impact," says Jil Zilligen, vice president of environmental initiatives. When faced with the study's results in 1994, the Patagonia board promised that by 1996 it would transition to 100 percent organic cotton. The company's fabric development and production teams were charged with figuring out whether organic cotton could provide the same quality products as conventionally grown cotton. If not, Patagonia would stop making cotton products altogether—quite a statement for a company heavily dependent on its apparel sales. "That gave everyone the motivation to figure it out. It affected every single person," says Zilligen. Once Patagonia made the commitment, it had to convince its fabric suppliers to change to organic cotton. Some suppliers made the switch, others didn't and lost Patagonia's business.

Continually Question In 1999, Memphis, Tenn.-based FedEx replaced its packaging with an envelope made from 100 percent recycled material (35 percent of which is postconsumer). That effort alone, the company says, has kept 7.9 million pounds of solid waste from going into landfills and decreased total environmental effects from production by an average of 30 percent. FedEx worked environmental concerns into its mission statement over time. "A lot of companies do this because they had some hiccup or issue where there was a violation," says Mitch Jackson, managing director of corporate and international environmental programs. "We didn't have that." In 1998, United Parcel Service (UPS) went after a reusable next-day-air envelope and incorporated increased levels of recycled material into its other packaging—and estimates say that those moves save more than 2,200 tons of trees every year. "We've never assumed that the way things are is the way they have to be," says Linda DiSantis, corporate compliance manger for UPS.



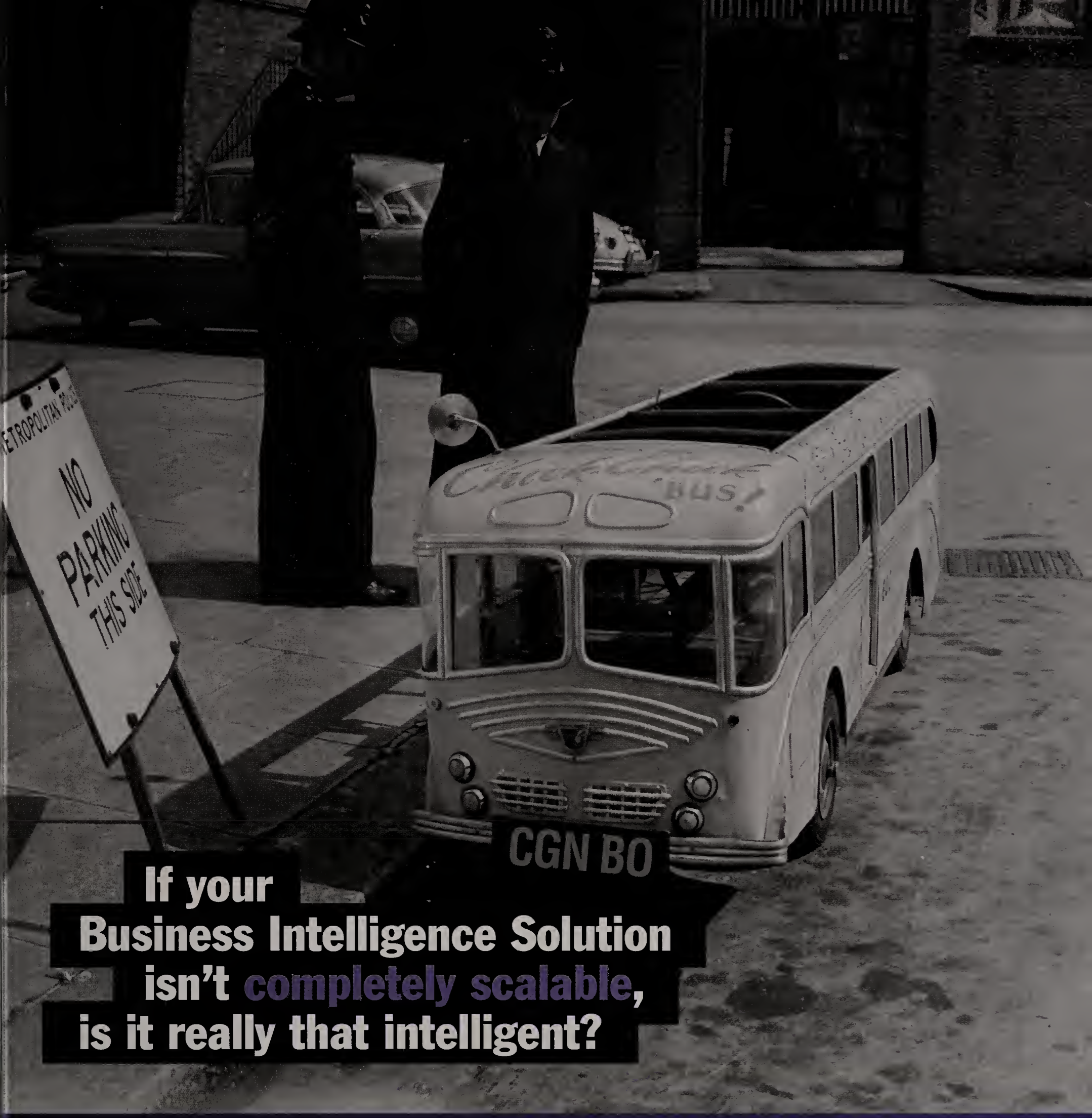
Get Ahead of the Curve In 1998, Patagonia officially incorporated the environment into its core mission with this pledge: "To use business to inspire and implement solutions to the environmental crisis." Among its goals was switching to renewable

GREEN RATERS

Two watchdogs on corporate environmentalism

THE COUNCIL ON ECONOMIC PRIORITIES (CEP), a New York City-based group, has been measuring corporate social responsibility since 1969. CEP considers more than 200 companies on disclosure, environment, minorities' advancement, women's advancement, workplace, family benefits and charitable giving. Just like in school, each company receives a grade of A through F in each category. The council also publishes "Shopping for a Better World," an annual guide to socially responsible shopping. And CEP keeps a list of environmental laggards, urging consumers to help make a difference by refusing to support environmentally irresponsible companies.

THE DOW JONES SUSTAINABILITY GROUP INDEX (DJSGI), based in Zurich, Switzerland, tracks the performance of leading sustainable driven companies. With a market cap exceeding $5 trillion, the DJSGI comprises the top 10 percent of sustainable leaders from the Dow Jones Group Index. The 200 companies that make up the DJSGI outperformed their counterparts on the Dow Jones in the first year of the DJSGI's existence (September 1999). In the last year, however, DJSGI stocks tumbled more quickly than the overall market. Dow Chemical and FedEx are part of the DJSGI, as well as companies such as Dell, Johnson & Johnson and Texaco. According to the Social Investment Forum—a Washington, D.C.-based nonprofit association that promotes socially responsible investing—such investing accounts for more than $2 trillion in assets in the United States. ***–M.M. Moore***



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Environment

energy. "In 1998, we did a lot of research in anticipation of California deregulating," says Patagonia's Zilligen. Today, Patagonia uses energy from freshly constructed renewable energy plants in its headquarters and four California stores. Wind powers the Denver store. Solar powers the customer service center in Reno, Nev.

Atone for the Past "Let's face it, we had a lot of improving to do," admits Samuel L. Smolik, vice president for environment, health and safety for Dow Chemical. Since 1996, Dow has published an annual report on the state of its 10-year environment, health and safety goals set in 1995. The most recent update, issued in May, claims the company reduced waste-to-production ratios by 25 percent between 1994 and 2000, chemical emissions by 43.5 percent and emissions of ozone depletors by 72 percent. In 1996, Dow recruited five local environmental activists to take part in an initiative to reduce toxic emissions at its Midland, Mich., site. By 1999, the project had reduced air and water emissions by 43 percent and reduced the waste stream by 37 percent with a potential annual savings of $5.4 million. In 2000, Dow gave a $2.5 million grant to the University of Michigan to establish a professorship in sustainable science, technology and commerce.

Embrace the New Although FedEx's business relies on gas-guzzling trucks to move its customers' packages, it is working to change that. Its current fleet of delivery trucks includes 570 EPA-certified low emissions vehicles. And, working jointly with the Boston-based Alliance for Environmental Innovation, FedEx has put out an RFP for a hybrid electric vehicle that will reduce air emissions by 90 percent and increase fuel efficiency by 50 percent. The goal is to have energy savers enter the fleet in 2005 and eventually replace FedEx's fleet of nearly 40,000 vehicles.

Are you Experienced? While the green approach ultimately benefits the environment, companies would not be taking such action if it didn't benefit their own bottom line. "In large part, companies have begun to understand that there is a connection between a good environment and good business results," says UPS's DiSantis. Those results can mean a better relationship with customers. "Our consumers have told us and others consistently for the last 20 years, 'We expect you to deliver what you're delivering in the most responsible way you can,'" says S.C. Johnson's Georgeson.

But the bottom line is still the bottom line. "We have to make money to stay in business, and we have to be successful in conventional business terms in order to influence other businesses," says Patagonia's Zilligen. "We're a successful, profitable business trying to figure out how to be successful under a broader definition of success." That's innovation for two good causes: your own and the planet's. CIO

Boston-based Freelance Writer Meg Mitchell Moore is doing her part—she's shopping for an energy-efficient hybrid car. Share your green thoughts with her at *megmoore@earthlink.net* and with us at *letters@cio.com.*

WHAT'S IN A NAME

The new CEO on the block—presenting the Chief Environmental Officer

THE DOW CHEMICAL CO. ■ Position: vice president for environment, health and safety ■ Created: 2000

FEDEX ■ Position: managing director of corporate and international environmental programs ■ Created: 1996

PATAGONIA ■ Position: vice president of environmental initiatives ■ Created: 2000—before that there was a director of environmental programs

S.C. JOHNSON & SON ■ Position: director of global environment and safety ■ Created: 2000

UNITED PARCEL SERVICE ■ Position: corporate compliance manager ■ Created: 1996

THE GREEN BIBLE

Every movement needs a bible, and the one for the environment-plus-business group is *Natural Capitalism: Creating the Next Industrial Revolution* (Back Bay Books, 2000), written by Paul Hawken, Amory Lovins and L. Hunter Lovins. With an overlap of business and environmental interests, natural capitalism advocates sound environmental and resource policies along with increased profits. Amory and L. Hunter Lovins are also co-CEOs of the Rocky Mountain Institute, a Boulder, Colo.-based nonprofit that helps organizations understand and live by those principles.

–M.M. Moore

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The CIO Role: Martha Stewart Living Omnimedia

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Multimedia publisher and retailer
Sheila Beauchesne, Senior VP and CIO
Martha Stewart, Chairman and CEO
www.marthastewart.com
Revenues: $286M
Employees: 570

For Martha Stewart's CIO, keeping up with the boss's demands is "a good thing"

WHAT MAKES SHEILA RUN

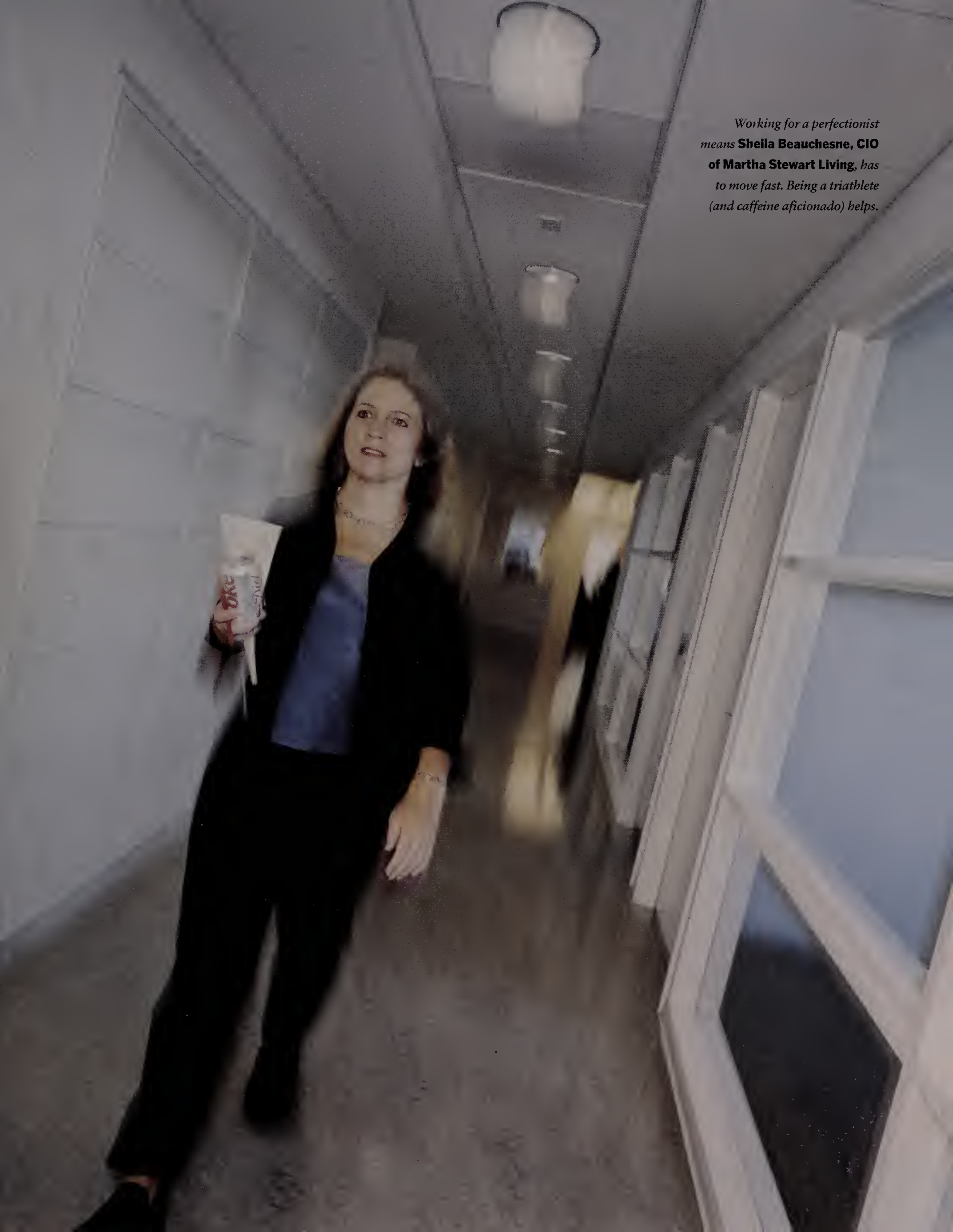
IT'S NOT EASY BEING LIKE MARTHA STEWART. MARTHA IS SMART. Martha is beautiful. Martha is organized. Martha is a multimillion-dollar businesswoman. In short, Martha is perfect, and she expects her products to be perfect too.

Enter Sheila Beauchesne (pronounced *boh-shayne*), CIO and senior vice president of Martha Stewart Living Omnimedia (MSO). She joined the 10-year-old New York City-based merchandising and media company on Oct. 18, 1999, the day it celebrated its IPO at the New York Stock Exchange.

Right now Beauchesne, 36, is tasked with the impossible: She has to make her boss's eponymous website as perfect as her boss. "With a perfectionist, you could do a thousand things, and even if

BY MERIDITH LEVINSON

Photography by Bernd Auers



Working for a perfectionist means **Sheila Beauchesne, CIO of Martha Stewart Living**, *has to move fast. Being a triathlete (and caffeine aficionado) helps.*

The CIO Role: Martha Stewart Living Omnimedia

At **Martha Stewart Living**, **CIO Beauchesne** *takes time every day to field coworkers' IT questions and listen to their ideas.*

999 of them are right, she's going to notice the one that's not," says Beauchesne. "[Stewart] has every right to because her name is on the brand, and the worst thing we could do is dilute the brand. It sets a high standard and makes you do better work, but it's tough."

On the surface, Marthastewart.com reflects the domestic diva's notorious attention to detail. The site contains 10,000 elegant pages filled with practical tips on everything from pruning roses to refinishing furniture.

But behind those pristine pages, the site's architecture is flawed. When it was developed in 1997 by a third-party vendor, Marthastewart.com—the domain for tips on gardening, crafts and cooking—was set up on one website, while Marthabymail.com—the company's shopping site—was put on another. Having two servers makes it impossible for the company to act on its strategy, which is to use content from its magazines, website and TV shows to sell its products online.

"A lot of people access our content, but a small percentage actually buy our products," Beauchesne says. "We think that by tying [how-to content and merchandise] together more tightly, we're going to get more customers and drive more e-commerce revenues." In October 2000, MSO tested that strategy. The company published a special Halloween issue of *Martha Stewart Living* that directed readers to the website to find more information on applying scary makeup and carving pumpkins as well as how to purchase face-painting and jack-o'-lantern kits. Sales were high, and many readers were converted to buyers, says Beauchesne.

To capitalize on that strategy, the content and e-commerce engine will reside on one website, which will in turn record data on how customers move around Marthastewart.com. The clickstream analysis will show how customers interact with the brand and will allow MSO to customize information for visitors. The new site will also have the infrastructure needed to stream TV shows and deliver content through wireless devices.

In addition to relaunching the website, Beauchesne is also developing an asset management system. This Web-enabled database will house digital files of the company's photographs, text and TV programs on a single system so that MSO can reuse them at little cost. Plus, Stewart and others constantly come to Beauchesne with suggestions for website features and questions about IT-based products. For instance, Stewart has suggested that Beauchesne develop The Organizer. This product would combine a document management system for keeping track of medical records and bills, a project management system, a calendar and a budgeting application.

"People would pay money to be organized the way Martha Stewart is organized," says Beauchesne. "The tough part is explaining [to Stewart] that it's not something you can develop easily."

New ideas are an inherent part of the business and culture at MSO; the company's creative spirit earned it the distinction of being a CIO-100 honoree. But keeping up with new ideas on a daily basis and tempering them with the realities of technology is no easy feat. During a typical workday, like the one described in the following section, Beauchesne has to keep projects on schedule and vendors in line—all with a smile on her face.

A.M.: INCREASE REVENUES

Lauren Stanich, president of publishing for MSO, breezes by Beauchesne's office. A minute later, Jesse Brink, senior staff writer for *Martha Stewart Living*, joins Stanich. Beauchesne has called them over to demonstrate a new technology product the company can use to make more money.

Beauchesne picks up an object from her desk that resembles a computer mouse, but it's shaped like a cat. It has no trackball on its underside, has a laser at the tip of its nose and is connected to her computer. She opens a catalog and passes the CueCat, as it's called, over a product's bar code. A few seconds later, her computer loads a webpage with the product she scanned. Beauchesne says readers equipped with the device, which is made by Digital Convergence, could scan a bar code printed with a magazine article about

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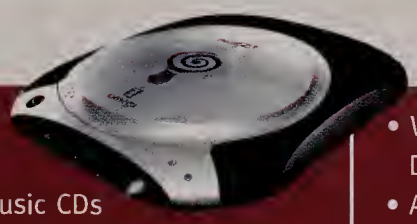

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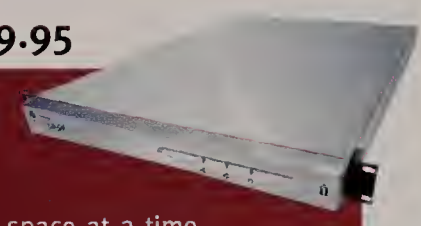

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hydrangeas, and their computer would instantly load a webpage featuring a panoply of products they could purchase to cultivate the flower. Similarly, if a pharmaceutical company put a bar code on its ad in the magazine, the reader could scan the code and get to the company's webpage. MSO could charge more for bar-coded ads, says Beauchesne.

If MSO circulated the CueCat to enough readers in its core demographic of 25- to 54-year-olds, it could aggregate information on their habits and preferences, Beauchesne says. But she can't devote time to the technology until the new site is running.

LUNCH: TRACK CUSTOMERS

Over baguette sandwiches, Beauchesne meets with the E-Selling Intelligence (ESI) team. ESI is helping to design the site's new architecture based on the data MSO plans to gather about its customers. ESI comprises MSO marketing and IT staff plus representatives from Fort Point Partners, a New York City-based consultancy that built Kmart's shopping site, BlueLight.com.

"From a technology perspective, we're duplicating what they did on BlueLight for Marthastewart.com," says Beauchesne. "We don't want to spend time developing something that already exists, like the way you check out [of an e-commerce site]. The [e-commerce] platform is not unique. It's what we're going to put on top of that [platform] that's innovative." For example, she plans to stream Stewart's TV shows on the site.

"We need data showing that content drives sales," Beauchesne says. "We need to know what percent of garden products were sold to a visitor who came from the magazine."

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For more insights read **TOP CIOS' LEADERSHIP SECRETS.** Find it at www.cio.com/printlinks.

Ryan Wener, a Fort Point Partners senior consultant, assures her that when the system goes up, MSO will be able to identify different sets of customers, such as those who subscribe to the magazine or have made online purchases, and track what new channels they patronize over time.

The meeting wraps up in an hour. Beauchesne dashes off to her last appointment.

P.M.: MANAGE DIGITAL ASSETS

Five coworkers crowd into Beauchesne's office to plan how they're going to move 10 years of video, photos and text online. Beauchesne says that the digital asset management system will simplify the way designers locate pictures as well as save money.

Currently the company's nearly 460,000 items of text, photographs and TV segments are stored on CD-ROMs in Photo Shop Web databases and on the TV editing system. If a designer needs a photo of a blue plaid couch, for example, she may have to ask at least two staffers where to find it, then call the magazine's prepress house to have it sent to her. Designers can spend days tracking down photos.

The new system will house 733GB of digital assets on a single server, which Beauchesne says is safer than storing proprietary information on a CD-ROM. Designers will be able to find what they need in minutes, know the size of each image, and learn whether it's been used in the magazine, on the website, in the *Martha By Mail* catalog, on a Kmart store sign or internally.

With the asset management system, MSO will be able to recycle its resources for free rather than rescan images or hire photographers to shoot pictures that already exist. For instance, a photographer might take 30 pictures of a basket of eggs for the company's annual report, but designers will use only one. Six months later, however, they might use another photo of the basket to complement a feature on the website about farm-fresh eggs. Beauchesne declined to say how much she was spending to build the system, but she says the company will get a return on this investment within two-and-a-half years.

She asks the team about the service that the vendor, Sausalito, Calif.-based WebWare, is providing. WebWare will customize the system according to the way Stewart works, which is like a designer. If she needs to search for a photograph by color, for example, searching by subject will be a waste of time, and Stewart famously likes to "make time, not waste time." One of the team members characterizes WebWare's responsiveness as "fair to good." Beauchesne says she'll talk to the CEO of WebWare.

EVENING: RUN, READ, RING

It's 4:30 p.m. Beauchesne will be at work until 10 p.m. Granted, one of those hours will be spent jogging. "I try to sneak out around 7 p.m. to run along Chelsea Piers," she admits.

During that early evening quiet time, she calls vendors to haggle with them on pricing or service, prepares work for the following day and reads the news.

On her way out of the office, she passes the glass-enclosed data center. If she notices jumbled wires, she'll tie them up neatly.

"With Martha Stewart, not only do you have to do everything perfectly, but it has to look nice too," she says. CIO

How does your day compare to Sheila Beauchesne's? Let Senior Writer Meridith Levinson know at *mlevinson@cio.com.*

A NEW MANAGEMENT system will house 733GB of Martha Stewart's digital assets on a single server.

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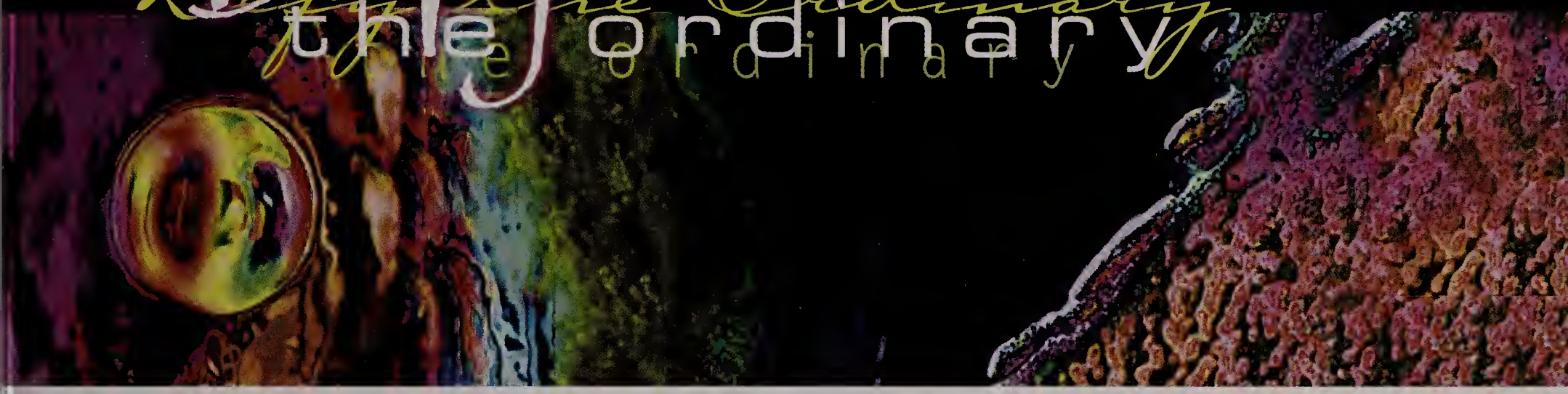

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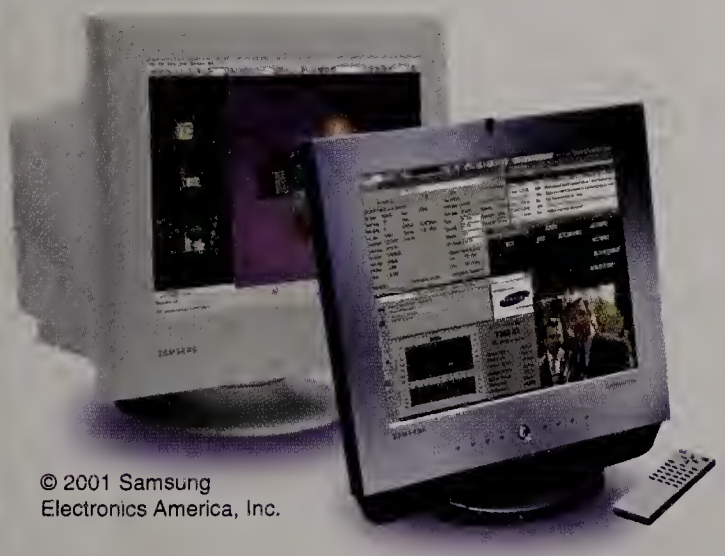

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THOMAS KUCZMARSKI
GARY HAMEL
ANITA McGAHAN
HOWARD A. RUBIN
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THE 2001 CIO-100 HONOREES REPRESENT ALL kinds of innovation, from new and effective developments in products and business processes to new relationships within and among enterprises. For insights into how companies can weave innovation throughout their businesses, we asked several thought leaders to address issues in their particular area of expertise. We check in with consultant **Thomas Kuczmarski** on product development teams. Author **Gary Hamel** comments on strategic approaches to success in a postindustrial era. Boston University professor **Anita McGahan** speaks on the importance of relationships, and metrics expert **Howard A. Rubin** addresses the necessity of measuring innovation. Finally, author **Michael Schrage**

HOW THINGS CHANGE

Five top gurus' views on innovation principles and practices

BY SANDY KENDALL

Photograph by Jeff Sciortino

THOMAS KUCZMARSKI

Senior partner and president of Kuczmarski & Associates, Chicago (*www.kuczmarski.com*); adjunct professor of marketing, Chicago Graduate School of Business

"With so much riding on new product development, it is critical that project teams are properly supported and structured to improve project and organizational success."

Think Tank

shares his thoughts on the effect of the Internet on innovation.

From their different perspectives, these thinkers agree that innovation must be an integral part of every enterprise, undertaken consciously and deliberately, for business success and longevity.

THOMAS KUCZMARSKI

Avoid the five deadly sins of new product teams

INNOVATIVE CORPORATIONS TODAY ARE OFTEN defined as having the ability to develop breakthrough, new-to-the-world products that expand market opportunity and accelerate revenue growth. Unfortunately, 70 percent to 80 percent of new product introductions crash and burn in their first year. How can corporate America avoid a new products future consisting of boring line extensions and "me too" competitor knockoffs?

One of the first steps should be taking a different approach to assembling and managing the teams tasked with developing new products and services. In many cases the failure of new products can be directly attributed to the ineffectiveness of the teams assigned to create them. Based on our experience and those of various cross-functional team experts, we've identified five deadly sins of new product teams.

1. The Visionless Team: It is amazing just how many new product projects are launched with no game plan. Without a clearly defined and agreed on set of goals and success criteria linked to the company's overall strategy, a new product team cannot determine what success looks like.

2. The Wrong Team Leader: Many companies still fall into the trap of choosing a project leader based on seniority instead of ability. New product leadership requires a unique skill set, different from that required to run an existing business.

3. The "Are You Serious?" Syndrome: This is exactly what team members say when they're tasked with developing breakthrough innovation that will change the future of the company in only two months' time—with no relief from their day-to-day responsibilities. Companies that take new product development seriously allow at least four months for a new products project and relieve team members of at least half of their daily job functions.

4. The Revolving Door: It's a month into the project when a "business emergency" develops that requires the immediate attention of two team members for the next three weeks. But don't worry, replacement members have been assigned! This is a momentum killer. In successful projects, once the team is selected, it stays intact until the end.

5. A Motivationless Environment: Developing a rewards and compensation structure to motivate team members is critical to the success of current and future innovation efforts. Sometimes the best motivators are the nonmonetary ones, such as face time with senior management. But that requires senior management involvement. New product success is not solely the task of the project team.

GARY HAMEL
Author of *Leading the Revolution*; chairman of Strategos, a strategic innovation consultancy, San Francisco (*www.strategos.com*); visiting professor of strategic and international management at the London Business School

"The challenge of innovation is part of the broader task of creating a postindustrial enterprise."

GARY HAMEL

Companies need to synthesize industrial and postindustrial virtues

COMPANIES INHERITED AN IMPORTANT SET OF virtues from the industrial era: diligence, efficiency, replication, control and operational excellence in general. If you go back before the industrial era, industries were characterized by few economies of scale and mostly small and inefficient enterprises. The great contribution of the industrial era was the

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invention of the large-scale industrial company. Virtues that characterized those companies will always be important but are becoming proportionately less so. In an age where business models decay with surprising speed, a new set of virtues will be required. These include creativity, imagination, diversity, speed, openness and the capacity for continual right-angle turns.

In recent years some individuals have attempted to characterize these two contrasting sets of virtues as old economy and new economy, but I've argued that those are misleading characterizations. Every so-called new economy company is right now trying to master the virtues of the industrial era, and every industrial age company is trying to master the new virtues of creativity, imagination and so on. It seems to me that the real challenge is to build organizations that represent a perfect synthesis of industrial and postindustrial virtues.

While important, most of the virtues that we have inherited from the industrial age bring with them many side effects. For example, in the industrial era, variety was often seen as the enemy—a variant from a quality standard or a production schedule was seen as a bad thing. All too often this kind of thinking led to a completely unhealthy devotion to conformance and alignment.

A second belief we inherited from the industrial era was that a company could be defined by its business model. Xerox sold copiers, Ford made cars, and Coca-Cola sold soft drinks. Yet if a company hopes to capture a disproportionate share of tomorrow's opportunities, it must learn to continually reinvent its most basic definition of what it is. For example, Coca-Cola has been late to adopt most of the major beverage trends in the last decade—fruit-flavored teas, designer waters, sports drinks and new-age beverages. It seems that Coca-Cola defines itself more as a cola company than a beverage company; it has become imprisoned inside a restrictive definition of its scope and charter.

What distinguishes a postindustrial enterprise from its industrial era predecessors is its ability to build and exploit three new sources of capital. Traditionally we have thought of companies as being composed of structural capital (facilities, networks, factories), intellectual capital (competencies, patents and intangibles) and financial capital. Yet structural, intellectual and financial capital do not create new wealth; they are themselves inert. To create new wealth one must continually reconfigure, redirect and redeploy these resources. For that to happen a company must build three new types of capital: imagination capital (the ability to imagine entirely new uses for the company's structural, intellectual and financial capital), entrepreneurial capital (the incentives and skills that engender the courage and capability to innovate) and relationship capital (the complex network of social interaction, both within the company and between it and other companies). These catalysts for wealth creation are the only insurance a company can buy against the risk of irrelevancy in a discontinuous world.

ANITA McGAHAN

Professor of strategy and policy, Boston University School of Management; associate professor of business administration, Harvard Business School

"Truly innovative leaders understand that their competitive advantage may lie in their relationships and management experience, not in their products and process."

ANITA McGAHAN

When adopting new technologies, be careful not to move too slow or too fast

WHAT WE HAVE LEARNED IN OUR RESEARCH IS that—in many industries—the challenge is not in seeing how trends and dynamics will affect long-term industry structure. Twenty years ago, it was clear that deregulation of

PHOTO BY JOHN SOARES

An open letter to readers of CIO Magazine

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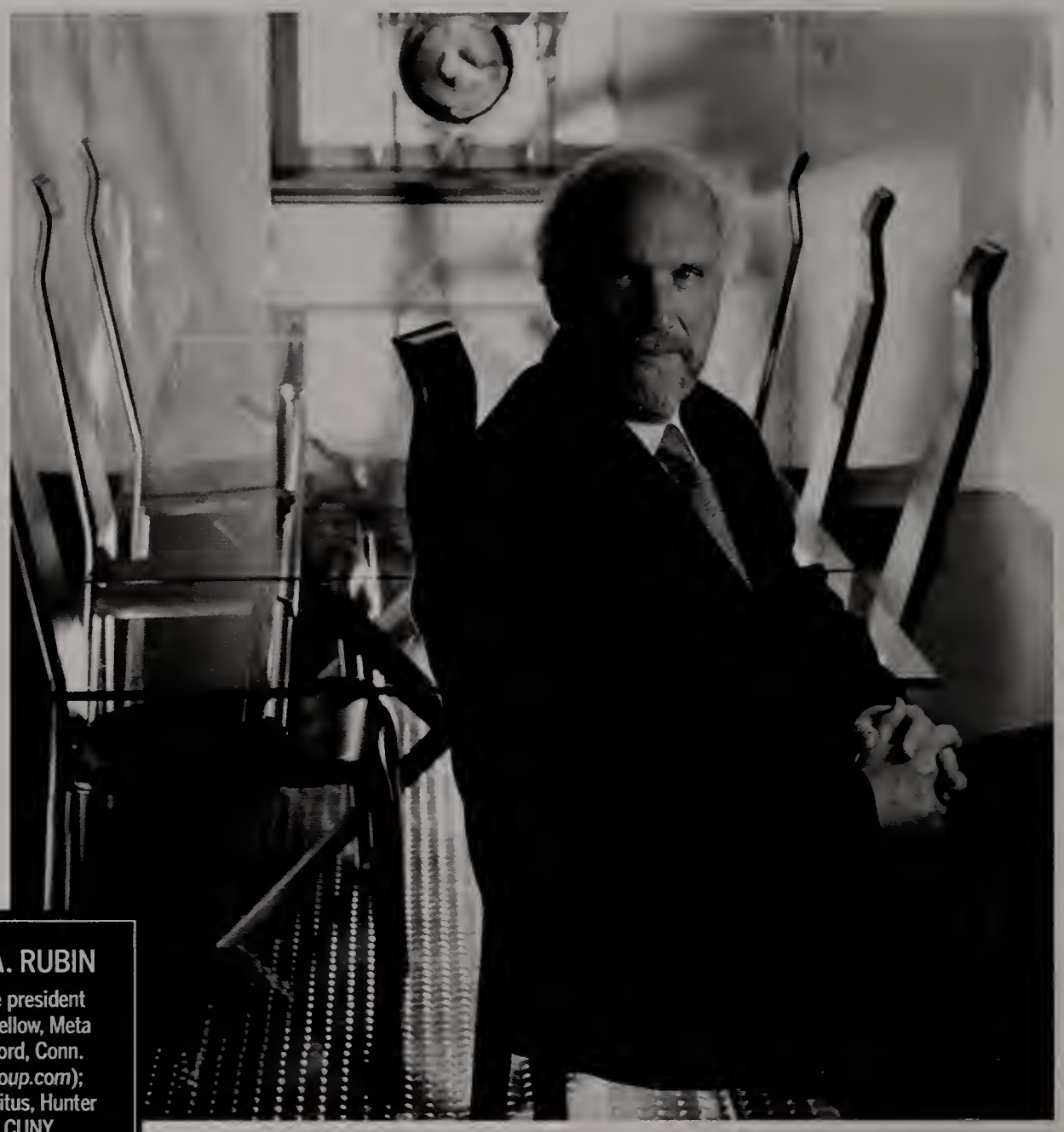
financial services, transportation and utilities would radically alter the structures of those sectors. Today, it's clear that digitalization will eventually lead to the widespread commercialization of radical new products and services across the economy. Many industry leaders will have to invest in a broad range of new capabilities to succeed.

So the difficulty is not in seeing the trends; it's in getting the timing right. Many chief executives think constantly about the risks of missing a new technology. But it can be equally risky to move too early—you might commit to technology that becomes obsolete, for example. Other early mover risks include overspending on experiments and diluting the organization's brand image through false starts on new product introductions.

One common approach to dealing with these challenges involves experimenting by setting up separate divisions to take advantage of new technologies. Many retailers have dealt with e-commerce opportunities on the Internet by establishing Web organizations separate from their mainline businesses. The intention is to integrate the Web organization once the return on investment is clear.

A second common approach involves undertaking major initiatives within specific parts of a company. For example, several major automobile companies have created separate intranets to streamline inventory management across dealerships, to improve customer financing operations and to procure auto parts at the lowest possible costs.

Both approaches—separate organization and functional integration—can be either enormously successful or abysmally unsuccessful. The separate organization can be less disruptive to the core business in the short run and can also provide a company with the chance to experiment. As a result, the returns on innovation are typically deferred. Functional integration can lead to shorter-term rewards to innovation, but it can also be enormously disruptive to the core business and can raise the stakes if the technology fails. The most innovative companies cope with these trade-offs by defining objectives and then measuring progress rigorously. For companies experimenting in separate divisions, this requires devising performance criteria that allow for experimental failures that deliver critical information about the viability of new technologies. A failed experiment is a success when it reveals underlying market demand for a new product or when it shows the true costs of a new process. An experiment is a true failure when nothing is learned.



HOWARD A. RUBIN
Executive vice president and research fellow, Meta Group, Stamford, Conn. (*www.metagroup.com*); professor emeritus, Hunter College of CUNY

"Innovation fits within a framework of indicators of a high performance organization, particularly in the realm of technology."

HOWARD A. RUBIN

Companies can measure innovation for competitive benchmarking

THERE IS LIKELY NO GREATER CHALLENGE FOR businesses and their technology organizations today than to balance the strains of the uncertain economy with the demands for sustainable innovation. Clearly, measures are needed to manage the whole portfolio of enterprise investments of which the innovation portfolio is a key—but not necessarily heavily funded—component.

The measurement of innovation itself requires a balanced view. Innovation cannot be measured simply by looking at the *results* of innovation: marketplace firsts, ROI, changes to revenue and profitability. The measurement of innovation must cover an enterprise's full innovation network.

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This network includes:

- Innovation activity
- Innovation management
- Innovation performance
- Innovation results

The measurement of *innovation activity* concerns the amount of work that is going on. Its focus is the current level of activity and the rate of change in activity in all innovation areas—from internal R&D to partnership arrangements to separate entities and ventures that are totally external, through the stages of ideation, conceptualization, development, and rollout and benefits capture.

In some ways this is also like a factory model indicating work in progress, work waiting in the queue, and work that has actually rolled out. In other ways the measures are more esoteric, for example, measuring the rate of increase of a company's innovation capital—ideas, documents and exchange of information within the innovation network itself.

Analyzing *innovation management* focuses on the operation of the innovation network: How big is it; how many partners are involved; how much is happening internally and externally; how much money, resources and personnel are flowing through the network, and at what rate?

Innovation performance analyses are analogous to measures of yield of an investment portfolio. This essentially involves assessing the total value of innovation (revenue growth, income, market positioning and, most important, shareholder value) against the total cost of innovation. It also has a more ethereal component in that innovation performance also needs to be measured in the realm of impact on the workplace and mind-set of the enterprise.

Innovation results measures are those used to guide the growth and investment in innovation itself. They focus on looking at the mix of activity, management and performance. This is also where the value of innovation comes in. The enterprise must look at the business growth and shareholder value created and attributed to the innovation portfolio versus the standard business portfolio. It is where the results of technology-driven innovation versus process or product innovation must be considered.

Perhaps the ultimate use of innovation measures is for competitive benchmarking. Companies must explicitly manage their innovation portfolio to either outpace, stay abreast of or trail their competitors. It is the ability to support agility in innovation that will likely be the determinant of business success in the early 21st century.

MICHAEL SCHRAGE

Coauthor of *Serious Play* and *No More Teams!*; research associate at the MIT Media Lab, Cambridge, Mass.; Merrill Lynch Forum innovation fellow and director for the Forum's Innovation Grant Competition

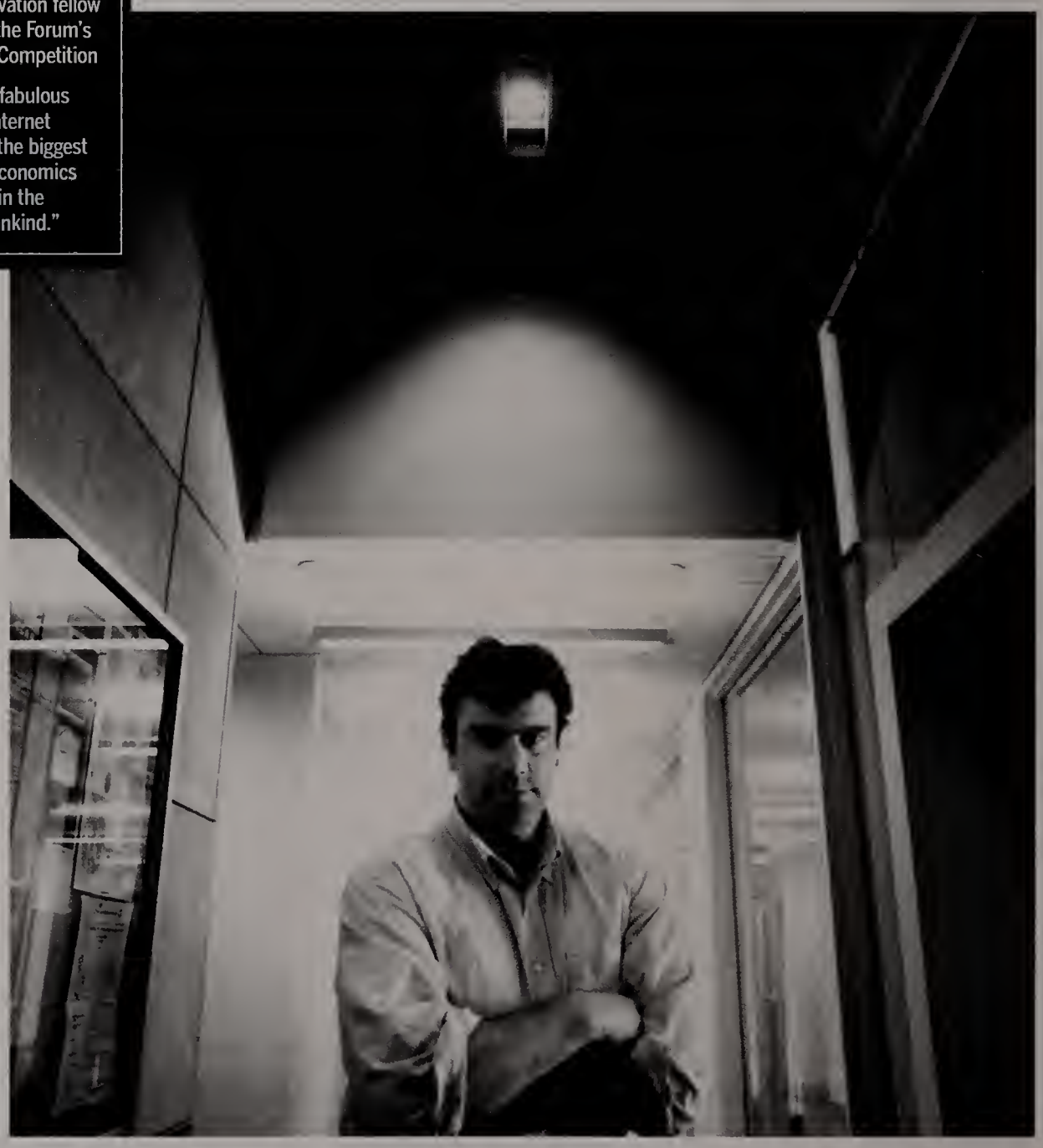
"What's been fabulous about the Internet is that it's been the biggest experimental economics laboratory in the history of mankind."

MICHAEL SCHRAGE

How to use the Internet to advance innovation

DECISIONS ABOUT APPROACHES TO THE Internet were made at a time when there was a market mania. It's one thing to make understandable mistakes and another to err by the orders of magnitude we saw. "Irrational exuberance," as it was described, was an understatement. Thinking something is twice as good as it really is is irrational exuberance, but thinking it is 100 times better than it really is is insane delusion. There's something wrong with not testing innovation metrics against common sense.

The fundamental aberration is not just in valuations but in behaviors associated with how businesses want to create and manage



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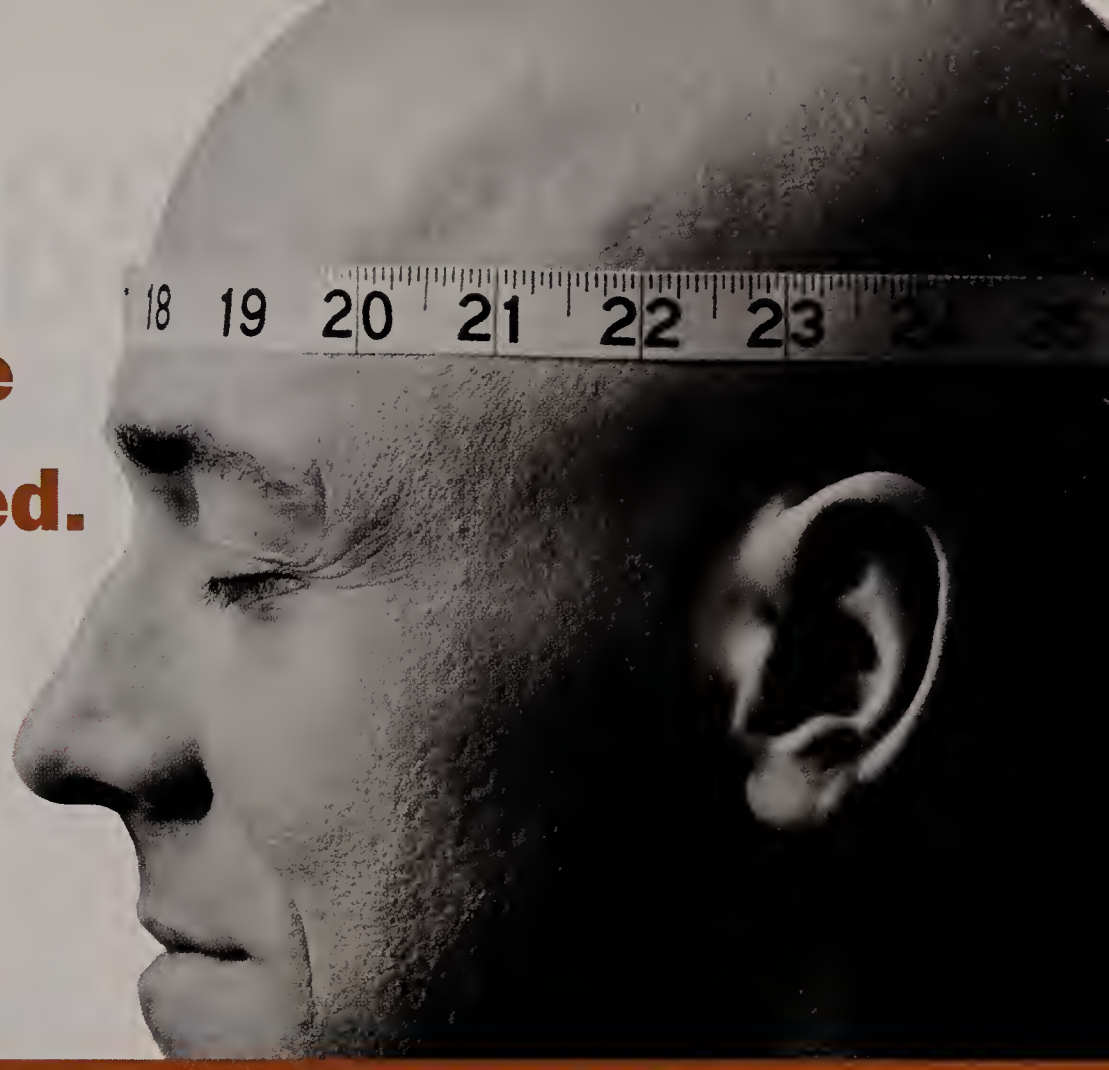
ANYONE WORKING

AT YOUR COMPANY **should have**

their head examined.



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value. Pure play? Brick-and-clicks? Spin-offs? Physical and virtual worlds should be complements, rather than one dominating the other. We'll see that tension and trade-off played out for generations.

A lot of organizations also had difficulty confronting the question of centralizing or decentralizing. In pure, raw, economic and financial theory, private B2B auctions should be the most efficient way of acquiring commodities or services. But in reality, human relationships can still trump economic efficiency. Dealing with one familiar person whom you think you can trust has some economic value. The fundamental tenet that the majority of businesses make the majority of their decisions based on rational criteria is a big, fat lie.

What I am finding now, though, is a new sophistication about the business fundamentals. As companies discover clever, innovative ideas, they ask, "How do we integrate this?" rather than immediately saying, "Let's spin this off to make a fortune." Here's an example of how crazy that latter model can be: What happened when everybody in the office got their own phone for the first time? The nature of communications changed. But did we spin off the telephone division and run it separately?

The Internet is a medium that lets organizations better decide what kind of innovator they want to be. Will they keep up with the Joneses, redefine the marketplace or have as many channels as possible? And how are they going to invest—all by themselves? Are they going to draw in customers? Key suppliers? Channels, or not? Independent of technology, these changes are about the culture of the organization.

The more choices you have, the more your values matter. What kind of innovator do you want to be? How do you map that onto the Internet? Those are painfully simple questions that organizations weren't answering. They preferred to imitate the apparent success of someone else rather than to be introspective about what they should do: monkey-see-monkey-do innovation management.

But now people have to rethink these things or else. Until recently, everybody thought, We'll fall behind, get crushed. That's what manias do. After you've had a binge you wake up with a headache. Some swear they'll never have another drink. Others have the hair of the dog. And there will always be a few folks who start frantically searching for the next bar.... CIO

Send your reactions or your own spin on innovation to Departments Editor Sandy Kendall at *skendall@cio.com*.

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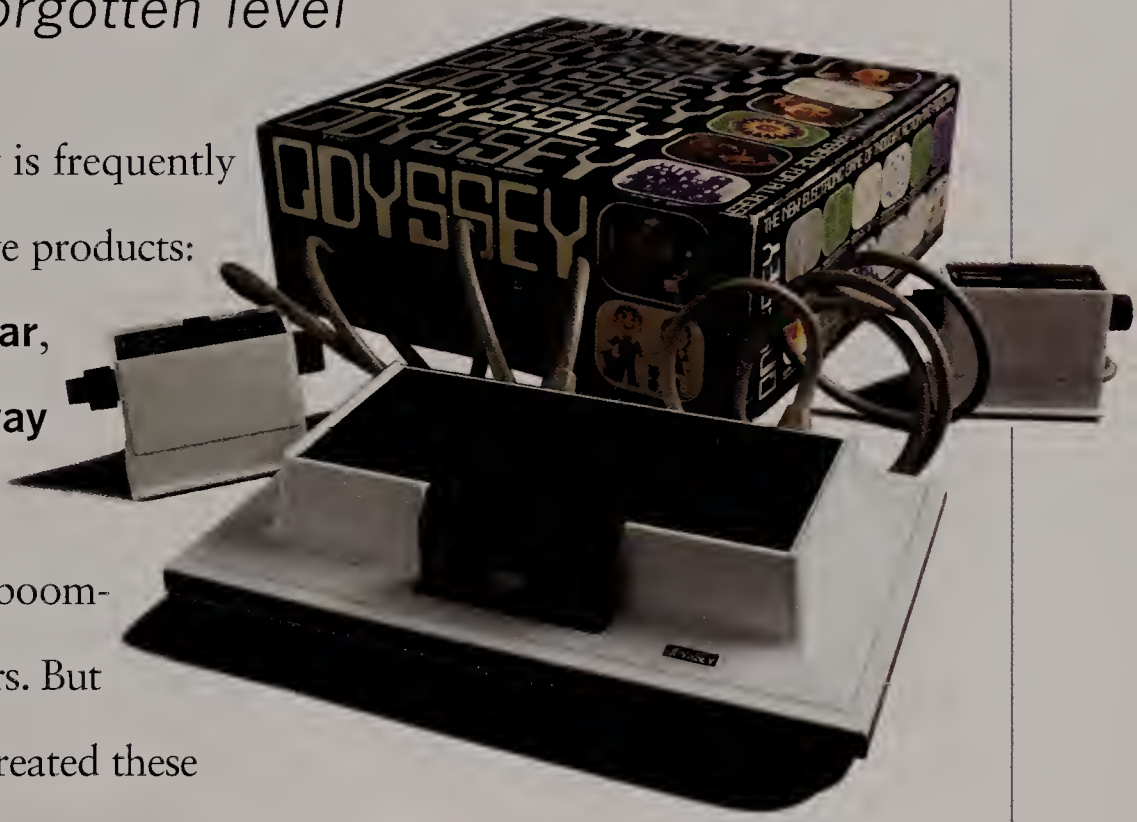


Magnavox Odyssey: game beginning, got Atari'ed

The frontier of the technology industry is frequently cruel to its pioneers. Consider these five products: **Magnavox Odyssey**, **Xerox Star**, **Commodore Amiga**, **Apple Newton**, **Gateway Destination**. Familiar? All five (OK, four of them) were the progenitors of markets that are booming today—video games and PCs of various flavors. But where are they today? Even the companies that created these markets are niche players—at best—in those thriving markets. The ideas behind these products were innovative and good, but they were just ahead of their time in one way or another.

Here are the five honorees in the category of Good Idea, Bad Timing.

Journey to Nowhere
Magnavox Odyssey

In 1972, Magnavox created the TV video game console with its release of the Odyssey, the forebear of today's Sony PlayStation and its ilk. The Odyssey was the brainchild of engineer Ralph Baer, who worked for a New Hampshire aerospace and defense company called Sanders Associates. The video game console was a concept Baer had been working on since 1966.

The Odyssey had several ingenious features. The graphics were of course primitive, but Baer's team worked around that problem by issuing a set of plastic overlays that players could stick on their TV screens—a different overlay for each game, such as a tennis court or a haunted house. And an optional "rifle pack" allowed for shooting gallery games. The toy rifle included a photoreceptor cell, which meant players could cheat by firing the gun at any nearby lightbulb.

The Odyssey cost less than $100 and had neither a CPU nor memory—each cartridge simply changed the box's wiring pattern. Magnavox sold several hundred thousand units but was swamped in the marketplace by Nolan Bushnell's more advanced Atari game console in the mid-1970s.

Xerox Star: GUI interface, gooey performance

A Star Is Born (Then Dies)
The Xerox Star Personal Computer

Xerox's Palo Alto Research Center (PARC) created the first GUI in 1981. So why didn't Xerox's first GUI system take the world by storm, as Apple's computers did shortly?

The usual answer: price/performance.

PARC displayed its Xerox 8010 Information System, better known as the Xerox Star, at a Chicago trade show in 1981. Star was actually the name of the interface, which included such GUI fundamentals as the metaphorical desktop workspace. Alas, the system ran slower than syrup in the deep

BY DEREK SLATER AND JOE SULLIVAN

PHOTO TOP BY SCOTT PETERSON; BOTTOM COURTESY OF XEROX PALO ALTO RESEARCH CENTER

New Fields of Opportunity

freeze, and its retail cost of $16,595 did little to compensate.

IBM's first PC (sans GUI) hit the scene at less than $5,000 a few months after the Star appeared. Today, of course, IBM is still a top player in the multibillion-dollar PC market.

And Xerox makes copiers.

Sound and Fury

The Commodore Amiga

Today, multimedia is a given. Two decades ago, it was on the cutting edge. Commodore

Commodore Amiga: audio and video, defunct maker

Computers led the charge with its 1985 commercial launch of the Amiga. (Commodore had acquired Amiga Computers the previous year.)

The Amiga's claim to fame was its video and audio editing tools. Even the earliest units had NTSC (National Television Systems Committee) and PAL (phase alternation line) connectors, allowing them to output edited video to camcorders, VCRs and the like. The first model featured a 7MHz Motorola 68000 processor with as much as 512 kilobits of random-access memory.

Surprise: The Amiga isn't dead—technically. Although Commodore is defunct, an Australian company called Amiga Inc. is still updating the Amiga operating system and has created specs in hopes of finding friendly manufacturers to release the first new Amiga hardware in six years. A small but loyal fan base of Amiga nuts is holding its breath.

Apple Newton: marketing overkill, product underperformance

Gravity Bonks Newton

The Apple Newton MessagePad

Personal digital assistants. That's the phrase both Apple Computers and Go Corp. were using back in the early '90s when they launched their respective handheld units.

Newton suffered from several handicaps. It was bulky and expensive for a handheld. However, Apple's biggest faux pas was probably the classic error of promising more than it could deliver. Larry Tesler, part of Newton's original development team, is on record saying the product's fate was sealed when the marketing department insisted on promising Newton users faultless handwriting recognition. Apple was locked in a first-to-market race with Go, creators of the PenPoint operating system, and wanted to create as much buzz as possible.

Unfortunately, early purchasers found the system's handwriting recognition unrecognizable.

Apple pruned the Newton from its product offerings in 1998. Go Corp. also went away, leaving the market to Pilots and Visors.

(Still) Waiting for Convergence

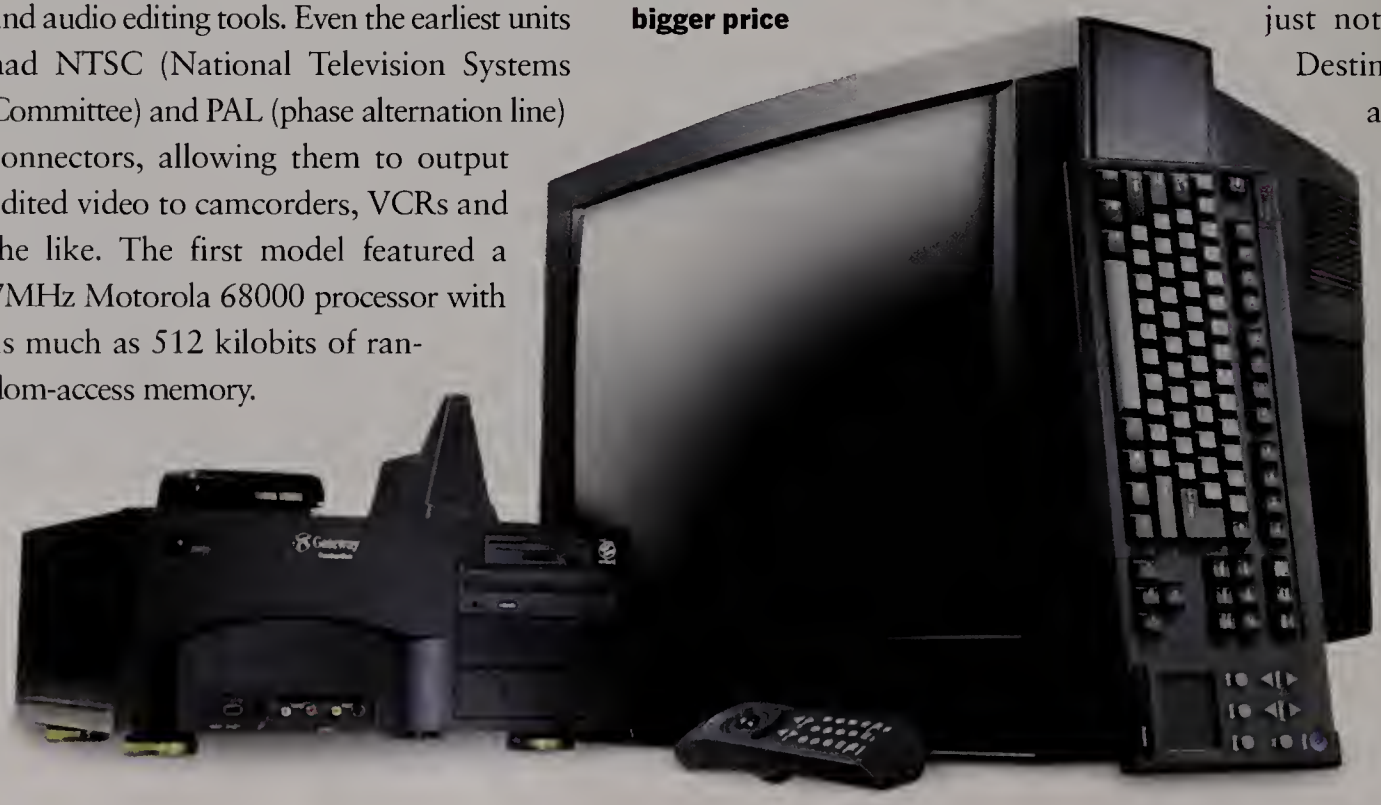
The Gateway Destination PC/TV

The concept behind our last honoree may still be ahead of its time. Or its time may never come at all. It's the Gateway Destination, a big-screen combination of PC and television introduced in 1996. Gateway's effort will stand as a representative for this class of device, which has seen earlier iterations like Apple's 1990s MacTV.

The concept makes some sense. After all, PC users frequently clamor for a bigger monitor, and the Destination's 31-inch screen fits that bill. Screen resolution on early models was limited to 800-by-600 pixels, but that is good enough for most PC applications. However, Gateway dropped the product, except for educational markets, in 1999.

Why didn't the Destination arrive? The $3,500 price tag played a part in its demise. More simply, consumers apparently were just not sure they needed one. Of the Destination's competitors, Compaq has also pulled the plug on its high-end PC Theater. Philips Electronics has had some success selling a TV/PC convergence box called the DVX8000 through a different channel—audio/video specialty retailers. CIO

Gateway Destination: big screen, bigger price



Executive Editor Derek Slater's first computer was a Commodore C64. Share your memories with him at *dslater@cio.com*. Editorial Assistant Joe Sullivan still plays his Atari with great fervor. Contact him at *jsullivan@cio.com*.

PHOTO LEFT COURTESY OF AMIGA; TOP COURTESY OF APPLE; BOTTOM COURTESY OF GATEWAY

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–JOHN PARKER, VP OF I.S. FOR NORTHWEST AIRLINES, ON FAST-TRACK INNOVATION

Illustrations by Campbell Laird

3M
St. Paul, Minn.
Diversified manufacturing
David P. Drew, VP of IT
W. James McNerney Jr., Chairman and CEO
www.3m.com
Revenues: $16.7B
Employees: 75,000

8TH CONTINENT LLC
Minnetonka, Minn.
Consumer products (wellness beverages) manufacturer
Parent companies: General Mills Inc. and E.I. duPont de Nemours and Co.
Scott Lutz, President and CEO
Anna Miskovsky, Director of R&D
www.8thcontinent.com
Revenues: NA
Employees: 17

ADAPTIVE COMPUTER TECHNOLOGY CENTRE, HUMAN RESOURCES DEVELOPMENT CANADA
Hull, Quebec
Federal government
Serge Rainville, Assistant Deputy Minister of Systems
Claire Morris, Deputy Minister
www.hrdc-drhc.gc.ca
Revenues: NA
Employees: 10

ALCOA INC.
Pittsburgh
Producer of aluminum products, from mining to recycling
Rudi P. Huber, VP and CIO
Alain J.P. Belda, Chairman and CEO
Richard B. Kelson, Executive VP and CFO
www.alcoa.com
Revenues: $22.9B
Employees: 142,000

AMERICAN RED CROSS
Washington, D.C.
Nonprofit humanitarian organization
Dr. Bernadine Healy, President and CEO
Joanne O'Rourke Hindman, Executive VP of Corporate Operations
Phil Zepeda, Director of Online Media
www.redcross.org
Revenues: $2.5B
Employees: 34,356

ASHOKA
Arlington, Va.
Nonprofit organization promoting change at the community level
William Drayton, Founder, Chairman and CEO
Sushmita Ghosh, President
www.ashoka.org
Revenues: $9.4M
Employees: 110

AUTOBYTEL.COM INC.
Irvine, Calif.
Online automotive commerce
Mark Lorimer, President and CEO
Dennis Benner, Executive VP of Corporate Development
www.autobytel.com
Revenues: $66.5M
Employees: 284

BALLARD POWER SYSTEMS INC.
Burnaby, British Columbia
R&D lab
Firoz Rasul, Chairman and CEO
Kip Smith, President and COO
www.ballard.com
Revenues: $41M
Employees: 800

BARTON MALOW CO.
Southfield, Mich.
Construction, architecture and engineering
Phil Go, CIO
Ben Maibach III, CEO
Lori Howlett, Vice President
www.bartonmalow.com
Revenues: $1.2B
Employees: 1,750

BEST BUY CORP.
Eden Prairie, Minn.
Retailer of consumer electronics, software and appliances
Marc Gordon, CIO and IS Leader
Dick Schulze, Founder, Chairman and CEO
Michael Frank, IS Leader of Enterprise Architecture and Integration
www.bestbuy.com
Revenues: $15.3B
Employees: 60,000

BP PLC
London
Petroleum and chemicals
Sir John Browne, Group CEO
Byron Grote, Chief Executive of Chemicals
John Leggate, Group VP of Digital Business
www.bp.com
Revenues: $148B
Employees: 100,000

CAPITAL ONE FINANCIAL CORP.
Falls Church, Va.
Financial services
Marge Connelly, Exec. VP of Card Operations and IT Infrastructure
Laura Olle, Senior VP of IT Systems Development
Richard D. Fairbank, Chairman and CEO
www.capitalone.com
Revenues: $5B
Employees: 20,000

CARGILL INC.
Minnetonka, Minn.
International marketer, processor and distributor

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–MARK HEDLEY, SENIOR VP AND CTO, WYNDHAM INTERNATIONAL

Lloyd Taylor, Corporate VP of IT
Warren Staley, CEO
Robert Lumpkins, Vice Chairman
www.cargill.com
Revenues: $48B
Employees: 85,000

CEMEX S.A. DE C.V.
Monterrey, Mexico
International cement company
Jose Luis Luna, CIO
Lorenzo H. Zambrano, Chairman and CEO
www.cemex.com
Revenues: $6B
Employees: 24,000

CHARLES SCHWAB & CO. INC.
San Francisco
Security brokerage and related financial services
Dawn Lepore, Vice Chairman, Executive VP and CIO
Charles R. Schwab, Chairman and Co-CEO
David S. Pottruck, President and Co-CEO
www.schwab.com
Revenues: $5.8B
Employees: 21,700

CITY OF PHOENIX
Phoenix
Local government
Danny W. Murphy, CIO
Frank Fairbanks, City Manager
www.phoenix.gov
Revenues: $2.1B
Employees: 14,163

COVISINT LLC
Southfield, Mich.
Global e-business exchange
Kevin Vasconi, CTO
Kevin English, Chairman, President and CEO
www.covisint.com
Revenues: NA
Employees: 350

DOLLAR RENT A CAR SYSTEMS INC.
Tulsa, Okla.
Retail car rental
Parent company: Dollar Thrifty Automotive Group Inc.
Bob Alston, VP of IT Services
Gary Paxton, President and CEO
www.dollar.com
Revenues: $823.9M
Employees: 4,500

THE DOW CHEMICAL CO.
Midland, Mich.
Manufacturer of chemical, plastic and agricultural products
David E. Kepler, VP of E-Business and CIO
Michael D. Parker, President and CEO
www.dow.com
Revenues: $30B
Employees: 50,000

EASTMAN CHEMICAL CO.
Kingsport, Tenn.
International chemical, fiber and plastics producer
Roger K. Mowen Jr., VP of Global Customer Services Group and CIO
Earnest W. Deavenport Jr., Chairman and CEO
www.eastman.com
Revenues: $5.3B
Employees: 15,000

ELECTROLUX LLC
Dallas
Vacuum cleaner manufacturer
Joseph P. Urso, CEO
James McCain, COO
Warren Bonham, CFO
www.electrolux-usa.com
Revenues: $250M
Employees: 5,000

ENERGIZER HOLDINGS INC.
St. Louis
Battery and flashlight company
Randy Benz, VP and CIO
Patrick Mulcahy, CEO
Randy Rose, President and COO of North America and Europe
www.energizer.com
Revenues: $1.9B
Employees: 10,480

ENRON CORP.
Houston
Electricity, natural gas and communications company
Jeffrey K. Skilling, President and CEO
Philipe A. Bibi, President and CEO of Enron Net Works
www.enron.com
Revenues: $101B
Employees: 15,000

ETC MUSIC INC.
Boston
Digital music distributor
Mark Hardie, CEO
Alex Diana, VP of Product Development
Yakov Leiken, VP of Engineering
www.etcmusic.com
Revenues: NA
Employees: 25

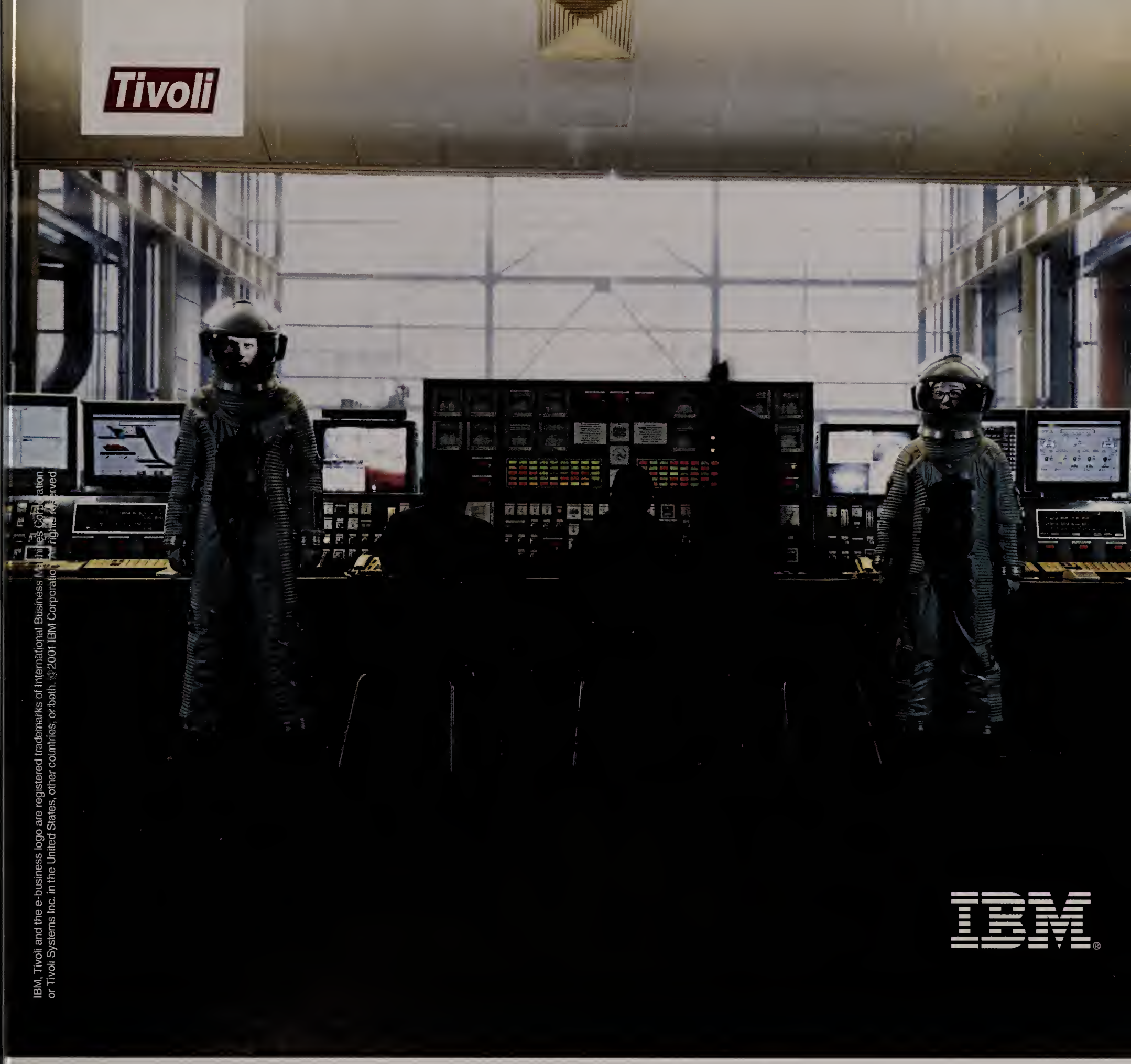
FEDEX CORP.
Memphis, Tenn.
Transportation and logistics services provider
Robert B. Carter, Executive VP and CIO
Frederick W. Smith, Chairman, President and CEO
www.fedex.com
Revenues: $18.3B
Employees: 215,000

FMR CORP.
Boston
Financial services
Edward C. Johnson III, Chairman, Director and CEO
Don Haile, President of Fidelity Investments Systems Co.
Steve Elterich, President of Fidelity eBusiness
www.fidelity.com
Revenues: $11.1B
Employees: 33,186

FOLEY & LARDNER
Milwaukee
Law firm
Douglas D. Caddell, CIO
Michael W. Grebe, Chairman and CEO
Darrell R. Ohlhauser, COO
www.foleylaw.com
Revenues: $363M
Employees: 2,500

GATEWAY HEALTH SYSTEM
Clarksville, Tenn.
Community hospital
Harun Rashid, CIO
Randy Kelley, CEO
www.ghsystem.com
Revenues: $140M
Employees: 985

GE MEDICAL SYSTEMS
Waukesha, Wis.
Medical information and technology systems
Parent company: General Electric Co.
Naren Gursahaney, GM of Global eBusiness and CIO



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–ROD KALBERER, RESEARCH SCIENTIST, INTERNATIONAL PAPER

Joseph M. Hogan, President and CEO
Gene Saragnese, VP of Global Technology Operation
www.gemedicalsystems.com
Revenues: $7.3B
Employees: 25,000

HOME SHOPPING NETWORK (HSN)
St. Petersburg, Fla.
Electronic retailing
Ken Waters, Senior VP of IT
Mark Bozek, President and CEO
Bob Rosenblatt, President HSN-U.S.
www.hsn.com
Revenues: $1.8B
Employees: 4,500

HONDA MOTOR CO. LTD.
Tokyo
Automobile, motorcycle and power products manufacturer
Hiroyuki Yoshino, President
www.honda.com
Revenues: $52M
Employees: 112,400

IBM CORP.
Armonk, N.Y.
Global IT company
Phil Thompson, CIO
Louis V. Gerstner Jr., Chairman and CEO
Nick Donofrio, Senior VP of Technology and Manufacturing
www.ibm.com
Revenues: $88.4B
Employees: 316,000

IBUILDING INC.
San Francisco
Producer of workflow and process management tools for commercial real estate
Martin Milani, CTO
Jacqueline Reses, CEO
www.ibuilding.com
Revenues: $2M
Employees: 36

INGRAM MICRO INC.
Santa Ana, Calif.
Global wholesale provider of technology products and supply chain management services
Guy Abramo, Chief Strategy and Information Officer
Kent B. Foster, Chairman and CEO
www.ingrammicro.com/corp
Revenues: $30.7B
Employees: 16,500

INTEL CORP.
Santa Clara, Calif.
Computer manufacturing
Douglas F. Busch, CIO
Craig R. Barrett, President and CEO
Prasad Rampalli, Director of Enterprise Business Computing
www.intel.com
Revenues: $33.7B
Employees: 87,666

INTERNATIONAL PAPER CO.
Stamford, Conn.
Paper products, packaging, building materials, chemical products and distribution
J. Chris Scalet, Senior VP of IT and CIO
John Dillon, Chairman and CEO
www.internationalpaper.com
Revenues: $30B
Employees: 113,000

ISPHERES CORP.
Oakland, Calif.
Applications integrator and consultancy
Santosh Alexander, CEO and Cofounder
Mani Chandy, Chief Scientist and Cofounder
www.ispheres.com
Revenues: NA
Employees: 55

JOHNS HOPKINS HOSPITAL WILMER EYE INSTITUTE
Baltimore
Research and management of complex eye cases
Dr. Morton F. Goldberg, Director of Ophthalmology Department
www.wilmereyeinstitute.net
Revenues: NA
Employees: 600

KEYBOWL INC.
Winter Park, Fla.
Manufacturer of keyless computer keyboard
Taha Sidani, CIO
Peter J. McAlindon, President and CEO
www.keybowl.com
Revenues: $500,000
Employees: 10

KRISPY KREME DOUGHNUT CORP.
Winston-Salem, N.C.
Specialty retailer
Frank Hood, VP of IS
Scott Livengood, Chairman, President and CEO
www.krispykreme.com
Revenues: $300M
Employees: 3,300

KSOLUTIONS INC.
Annapolis, Md.
Business services and consulting
Cornelius Mendoza, CIO
Stephen Cranford, CEO
Mike Porter, Executive VP of Services
www.ksolutionsinc.com
Revenues: $50M
Employees: 59

LABBOOK INC.
McLean, Va.
Informatics provider for biotechnology, pharmaceutical and academic life science research
Joe Spitzner, VP and CTO
Shawn Green, Chairman, CEO and Cofounder
Jean-Laurent Gentile, Director of Technology
www.labbook.com
Revenues: $14M
Employees: 50

LABMORGAN
New York City
Financial and business consulting
Parent company: J.P. Morgan Chase & Co.
Ameet Patel, CTO
Denis O'Leary, Cohead
Nicolas Rohatyn, Cohead
www.labmorgan.com
Revenues: NA
Employees: 300

LANDS' END INC.
Dodgeville, Wis.
Clothing retailer
John Loranger, VP of IS and CIO
David Dyer, President and CEO
Bill Bass, Senior VP of E-Commerce/International
www.landsend.com
Revenues: $1.5B
Employees: 9,500

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Edward F. Nesta, Senior VP of Operations
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–SCOTT LUTZ, PRESIDENT AND CEO, 8TH CONTINENT

Revenues: $42M
Employees: 350

LOKA INSTITUTE
Amherst, Mass.
Nonprofit research and outreach organization
Jill Chopyak, Executive Director
www.loka.org
Revenues: $250,000
Employees: 4

MAPPING YOUR FUTURE
Austin, Texas
Cooperative public service project providing career-planning college selection and financial-aid info
Clark Wold, Chairman, CEO and President of Education Assistance Corp.
Catherine Mueller, Assistant VP and Senior Project Manager
Marc Lazo, Senior Software Engineer
www.mapping-your-future.org
Revenues: NA
Employees: 3

MARRIOTT INTERNATIONAL INC.
Washington
Worldwide hospitality company
Carl Wilson, Executive VP and CIO
William J. Shaw, President and COO
Bruce Wolff, Senior VP of Distribution Sales and Marketing
www.marriott.com
Revenues: $19.8B
Employees: 154,000

MARTHA STEWART LIVING OMNIMEDIA INC.
New York City
Multimedia publisher and retailer
Sheila Beauchesne, Senior VP and CIO
Martha Stewart, Chairman and CEO
www.marthastewart.com
Revenues: $286M
Employees: 570

MATERIAL INNOVATIONS INC.
Huntington Beach, Calif.
Aerospace
James C. Calder, President
Victor S. Carbajal, Laboratory Manager
www.matinnovations.com
Revenues: $750,000
Employees: 6

MILLENNIUM TELESERVICES
Edison, N.J.
Telemarketing company
Leif Maiorini, CIO
Eric Greenberg, CEO
Brian Pasch, Managing Partner
www.mmtel.com
Revenues: NA
Employees: 6,200

THE MITRE CORP.
Bedford, Mass.
Independent, nonprofit technology resource for the U.S. government
David H. Lehman, Senior VP and Chief Information and Technology Officer
Alfred Grasso, Senior VP and GM of Washington C3 Center
Martin C. Faga, CEO
www.mitre.org
Revenues: $650M
Employees: 4,700

NETFORM INTERNATIONAL INC.
New York City
Business services and consulting
Karen Stephenson, President and CEO
www.netform.com
Revenues: $3M
Employees: 5

NEWPORT NEWS SHIPBUILDING INC.
Newport News, Va.
Defense contractor and shipbuilder, including repair and overhaul of military vessels
Stephen C. Hassell, VP and CIO
William P. Fricks, Chairman and CEO
Thomas C. Schievelbein, Executive VP and COO
www.nns.com
Revenues: $2.1B
Employees: 17,000

NOKIA CORP.
Espoo, Finland
Mobile communications
Jorma Ollila, Chairman and CEO
Mikko Kosonen, Senior VP of Strategy and Information Management
www.nokia.com
Revenues: $27B
Employees: 60,000

NORTEL NETWORKS CORP.
Brampton, Ontario
Communication carrier
Richard Ricks, CIO
John Roth, President and CEO
www.nortelnetworks.com
Revenues: $30.3B
Employees: 75,000

NORTHWEST AIRLINES
Eagan, Minn.
International air carrier
John Parker, VP of IS
Richard Anderson, CEO
Douglas Steenland, President
Al Lenza, VP of Distribution Planning and E-Commerce
www.nwa.com
Revenues: $11B+
Employees: 55,000

ONCOLOGY THERAPEUTICS NETWORK
San Francisco
Distributor of cancer drugs and other products, applications and services
Sue Dubman, CIO
Thomas Ludlam, CEO
www.otn-online.com
Revenues: $1.8B
Employees: 144

PALM INC.
Santa Clara, Calif.
Provider of mobile information management systems
Marina Levinson, CIO
Carl Yankowski, CEO
www.palm.com
Revenues: $1B
Employees: 1,428

PATAGONIA INC.
Ventura, Calif.
Designer and distributor of technical outdoor apparel
Michael Crooke, CEO
Bob Kelleher, VP of Finance and Operations
Jil Zilligen, VP of Environmental Initiatives
www.patagonia.com
Revenues: $223M
Employees: 1,000

PAUL, HASTINGS, JANOFSKY & WALKER LLP
Los Angeles
International law firm
Mary Odson, CIO
Seth M. Zachary, Chairman
www.paulhastings.com
Revenues: $388.5M
Employees: 1,925

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"INNOVATION is not about implementing a computer system. It's about developing practices and helping people develop closer relationships with customers. Anyone can install a computer or implement an Ariba or J.D. Edwards product, but it's how you do those things that makes you different."

–JOSE LUIS LUNA, CIO, CEMEX

PFIZER'S DISCOVER TECHNOLOGY CENTER
Cambridge, Mass.
High speed R&D prescription medicines for humans and animals
Parent company: Pfizer Inc.
Rod MacKenzie, VP of Discover Technology Center
Henry McKinnell, Chairman and CEO
George Milne, Executive VP of Pfizer Global R&D and President of Worldwide Strategic and Operations Management
www.pfizer.com
Revenues: $29.6B
Employees: 95,000

PHH ARVAL
Hunt Valley, Md.
Vehicle leasing and management services
Parent company: Cendant Corp.
Mickey Lutz, Senior VP of IT
George J. Kilroy, President and CEO
www.phh.com
Revenues: $1B+
Employees: 1,200

PROGRESSIVE CASUALTY INSURANCE CO.
Mayfield Village, Ohio
Auto insurance and associated services
Raymond Voelker, CIO
Glenn Renwick, CEO and President
www.progressive.com
Revenues: $6.2B
Employees: 19,490

QUANTUM MAGNETICS
San Diego
Development and commercialization of patents based on magnetic resonance technology
Parent company: InVision Technologies Inc.
Lowell Burnett, President and CEO
Caroleen Williams, Director of Government and Media Relations
Peter Czipott, Research Applications Manager
www.qm.com
Revenues: $10.5M
Employees: 85

QVC INC.
West Chester, Pa.
E-commerce retailer
John Link, CIO
Doug Briggs, President
John Hunter, Senior VP of Customer Services
www.qvc.com
Revenues: $3.6B
Employees: 11,000+

RED-M
Wexham, Slough, U.K.
Developer of Bluetooth networking solutions
Parent company: Madge Networks N.V.
Michael Wilson, CEO
www.red-m.com
Revenues: $35M
Employees: 100

ROYAL BANK OF CANADA
Toronto
Financial services
Irene Sobolewski, Senior VP of IS and Project Support, Systems and Technology
Martin J. Lippert, CIO and Vice Chairman
Gord Nixon, President and COO
www.royalbank.com
Revenues: $2.2B
Employees: 54,000

ROYAL CARIBBEAN CRUISES LTD.
Miami
Leisure cruise company
Thomas H. Murphy, CIO
Richard Fain, CEO
Jack Williams, President of Royal Caribbean International RCI
www.royalcaribbean.com
Revenues: $2.7B
Employees: 24,000

RUMSEY ENGINEERS INC.
Oakland, Calif.
Construction, architecture and engineering
Peter Rumsey, President
www.rumseyengineers.com
Revenues: $1M
Employees: 12

SBC COMMUNICATIONS INC.
San Antonio
Communication carrier
Ed Glotzbach, CIO
Edward E. Whitacre Jr., Chairman and CEO
Van Taylor, Senior VP of Network Services Staff
www.sbc.com
Revenues: $53.3B
Employees: 216,000

S.C. JOHNSON & SON INC.
Racine, Wis.
Manufacturer of household cleaning, storage, insect control and personal care products
Daniel Horton, VP and CIO
H. Fisk Johnson, Chairman
William D. Perez, President and CEO
www.scjohnson.com
Revenues: $4.5B
Employees: 9,500

SECURITIES INDUSTRY AUTOMATION CORP.
Brooklyn, N.Y.
Runs computer systems and networks for the New York and American stock exchanges
Charles B. McQuade, Chairman and CEO
Brian Cosgrove, Senior Director of Community Relations and Corporate Communications
www.siac.com
Revenues: $405M
Employees: 1,500

SENTARA HEALTHCARE
Norfolk, Va.
Nonprofit regional health-care organization
Bert Reese, CIO
David L. Bernd, CEO
Howard Kern, COO
www.sentara.com
Revenues: $1.2B
Employees: 14,000

SNAP-ON INC.
Kenosha, Wis.
Supplier of tools, diagnostic computers and information systems to the automotive repair industry
Alan T. Biland, VP, CIO and President of Diagnostics and Information Group
Dale F. Elliott, President and CEO
www.snapon.com
Revenues: $2.2B
Employees: 14,000

SOFTWARE AG INC.
Reston, Va.
Systems software provider
Peter Lehmann, VP of Corporate IT
Gary Voight, President and CEO
Erwin Konigs, Chairman and CEO of Software AG
www.softwareagusa.com
Revenues: $350M
Employees: 3,500

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The 2000 holiday season was make-or-break time for e-tailers, and no one was more aware of that than Brooks Brothers. The decision to outsource its site operations enabled them to focus on growing its e-commerce business, rather than on building and managing its Internet infrastructure.

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The SiteSmith Operations Platform is a comprehensive, flexible solution for companies like Brooks Brothers who demand reliable and secure managed hosting. With a 100% uptime guarantee, fixed monthly pricing, and no start-up fee, our solution is predictable and cost-effective.

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THE HONOREES

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–ROBERT CARTER, EXECUTIVE VP AND CIO, FEDEX

SOUTHWEST GAS CORP.
Las Vegas
Natural gas purchasing, transportation and delivery
Dudley J. Sondeno, Senior VP and Chief Knowledge and Technology Officer
Michael O. Maffie, President and CEO
www.swgas.com
Revenues: $1B
Employees: 2,491

STAPLES INC.
Framingham, Mass.
Business supply retailer
Brian Light, Executive VP and CIO
Thomas G. Stemberg, Chairman and CEO
www.staples.com
Revenues: $10.7B
Employees: 50,000+

STARBUCKS CORP.
Seattle
Coffee purveyor
Sherry Maple, VP of IT and Information Strategies
Kenneth Stringer, VP of IT and Global Shared Services
Orin Smith, President and CEO
www.starbucks.com
Revenues: $2B
Employees: 40,000

STREAM THEORY INC.
Moffett Field, Calif.
Broadband and streaming software services
Steig Westerberg, President and CEO
Tim Pivnicny, VP of Marketing
www.streamtheory.com
Revenues: $7.4M
Employees: 24

THE SWATCH GROUP LTD.
Biel/Bienne, Switzerland
Watch manufacturer
Nicolas G. Hayek, CEO
www.swatchgroup.com
Revenues: $2B
Employees: 19,000

TENET HEALTHSYSTEMS INFORMATION SYSTEMS
Dallas
IT arm for Tenet Healthcare Corp., a nationwide provider of health-care services
Stephen F. Brown, CIO
Jeffrey C. Barbakow, CEO
www.tenethealth.com
Revenues: NA
Employees: 50

TRANSCLICK INC.
New York City
Application service provider
David Wong, CIO
Robert Levin, CEO
Arthur Cheng, Director of Technology
www.transclick.com
Revenues: $3M
Employees: 12

TRUSERV CORP.
Chicago
Member-owned cooperative of independent retailers
Neil Hastie, Senior VP and CIO
Donald J. Hoye, President and CEO
www.truserv.com
Revenues: $4B
Employees: 5,500

TUFTS UNIVERSITY
Somerville, Mass.
Private undergraduate and graduate university
Bruce A. Metz, VP of IT and CIO
John DiBiaggio, President
www.tufts.edu
Revenues: $400M
Employees: 4,000

UNITED PARCEL SERVICE OF AMERICA INC.
Atlanta
Express carrier and package delivery service
Ken Lacy, CIO
James Kelly, CEO
www.ups.com
Revenues: $30B
Employees: 359,000

UNITED STATES JOINT FORCES COMMAND
Norfolk, Va.
Federal and military government
Anthony Bell, CIO
William Kernan, Commander in Chief
www.jfcom.mil
Revenues: NA
Employees: 5,000

U.S. COAST GUARD ELECTRONIC SYSTEM SUPPORT UNIT BOSTON
Boston
Federal and military government
Paul Desisto, CIO
Cmdr. Bob Day, Commanding Officer
www.uscg.mil
Revenues: NA
Employees: 185

THE VANGUARD GROUP INC.
Valley Forge, Pa.
Financial services
John J. Brennan, CEO and Chairman
Robert A. DiStefano, Managing Director
www.vanguard.com
Revenues: NA
Employees: 11,000

VIRTUALBANK
Palm Beach Gardens, Fla.
Online financial services
Gregory Bergman, Senior VP and CIO
Rory Brown, Chairman and CEO
Courtney McCashland, Executive VP and Chief Marketing and People Strategy Officer
www.virtualbank.com
Revenues: NA
Employees: 104

VISA INTERNATIONAL SERVICE ASSOCIATION
San Francisco
Financial services
Malcolm Williamson, President and CEO
Philip Yen, Executive VP of e-Visa International
www.visa.com
Revenues: NA
Employees: 5,000

VOCALPOINT TECHNOLOGIES
San Francisco
Internet access provider and ISP
Garry Chinn, CIO
Kurt Losert, CEO
www.vocalpoint.com
Revenues: NA
Employees: 70

WASTE MANAGEMENT INC.
Houston
Provider of comprehensive waste management services
Thomas Smith, Senior VP and CIO
Maury Myers, Chairman, President and CEO
www.wm.com
Revenues: $12B
Employees: 57,000

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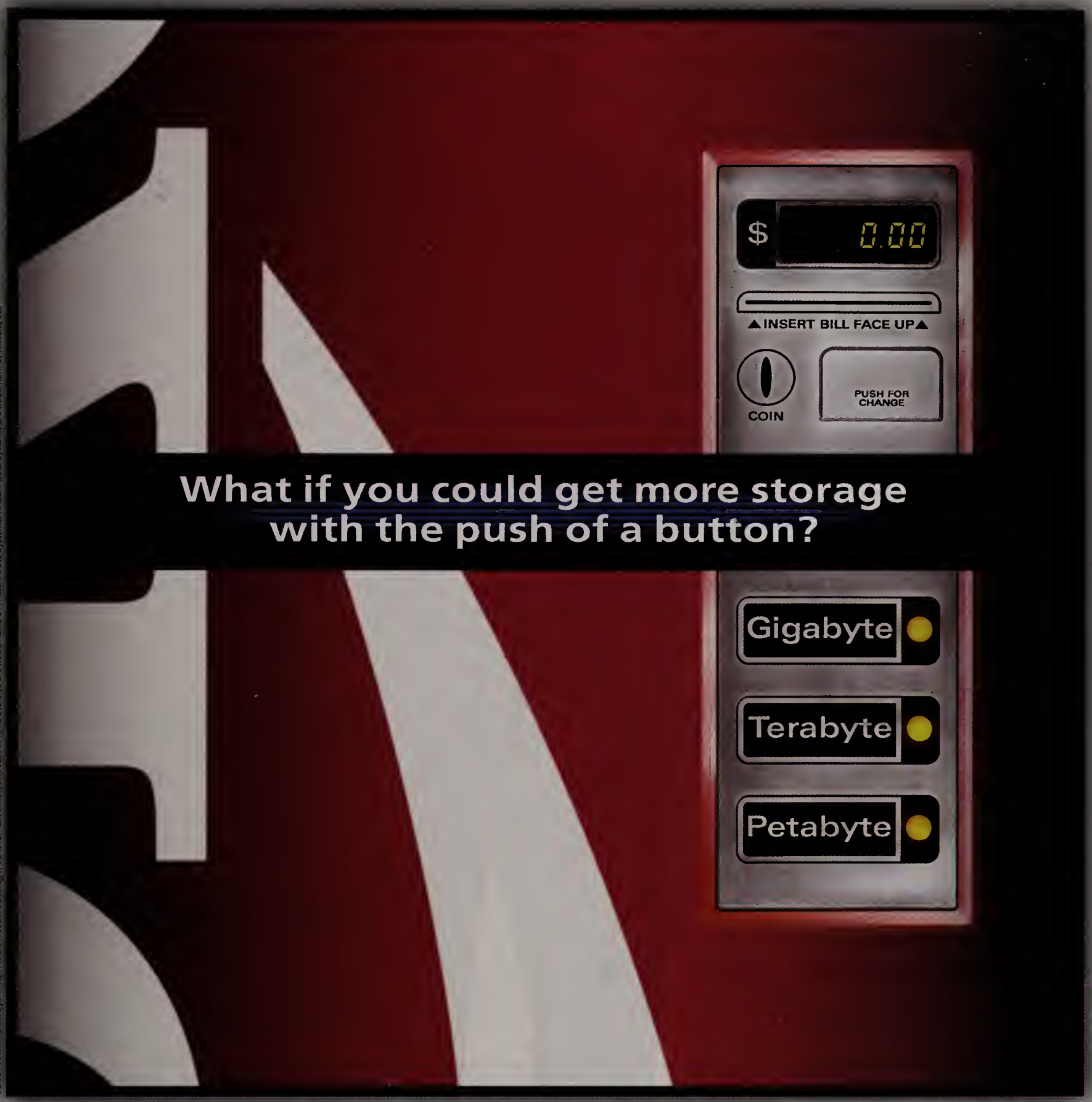

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THE HONOREES

"THIS IS WHAT companies don't understand: I can do a lot of innovations on the Internet very quickly, but if it takes customers a year to absorb then my rate of innovation is irrelevant."

–MICHAEL SCHRAGE, COAUTHOR OF *SERIOUS PLAY: HOW THE WORLD'S BEST COMPANIES SIMULATE TO INNOVATE*

WORLDWIDE RETAIL EXCHANGE LLC
Alexandria, Va.
Integrated worldwide exchange community for retailers and suppliers
Don Norman, CIO
Colin Dyer, CEO
www.wwre.org
Revenues: NA
Employees: 76

W.W. GRAINGER INC.
Lake Forest, Ill.
Provider of maintenance, repair and operating supplies, services and related information
Richard L. Keyser, Chairman and CEO
Wesley M. Clark, President and COO
Carl Turza, GM of Grainger.com
www.grainger.com
Revenues: $5B
Employees: 16,192

WYNDHAM INTERNATIONAL INC.
Dallas
Hotel and management services
Mark F. Hedley, Senior VP and CTO
Fred J. Kleisner, Chairman and CEO
www.wyndham.com
Revenues: $2.6B
Employees: 29,000

XTIME INC.
San Mateo, Calif.
Provider of service automation, time inventory management and resource planning products
Garret Swart, CTO
John Stewart Lee, Founder and CEO
www.xtime.com
Revenues: NA
Employees: 50

YELLOW FREIGHT SYSTEM INC.
Overland Park, Kan.
Transportation and movement of goods and materials
Parent company: Yellow Corp.
Lynn Caddell, President of Yellow Technologies Inc.
James Welch, President and COO
www.myyellow.com
Revenues: $2.8B
Employees: 25,000

ZARA
A Coruña, Spain
Clothing designer, manufacturer and retailer
Parent company: Edificio Inditex
Jose M. Castellano, CIO of Inditex Group
www.inditex.com
Revenues: NA
Employees: 24,000

ZIPCAR
Cambridge, Mass.
Automobile and time-sharing services
Roy Russell, VP of Technology and CIO
Robin Chase, Founder and CEO
www.zipcar.com
Revenues: $1M
Employees: 12

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Inside

new products *148*

predictions
fast and free: Ethernet cards take off *152*

revisit
filling the data warehouse *157*

under development
making new memories *160*

Edited by Christopher Lindquist. Send your thoughts and ideas for future columns to et@cio.com.

ILLUSTRATION BY BEN GOSS

Information Mobilization

Choosing how to make existing apps road-ready **BY J. BROWN**

WHEN DAVID SCHMERSAHL, director of business development for Arch Wireless, was looking for ways to improve his company's bottom line, he decided to practice what Arch preaches. The Westborough, Mass.-based Internet messaging and mobile information company enables clients to operate more efficiently using pagers and other mobile devices. Yet the company's 1,600-member sales force continued to operate under a paper-based system fraught with errors.

Owing to Arch's numerous products, multiple service options and high sales volume, placing orders was time consuming and expensive. Salespeople would either phone in orders to a

mobile solutions...data warehousing...network interfaces...new memory

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INTERACTIVE
What do you have to say?

call center or write them down and enter the information into a computer once they returned to the office. This process often produced errors, causing the billing system to reject more than 10 percent of orders. Rejected orders forced service people, sales representatives and customers into a reverification cycle that cost even more time and money.

a more sophisticated approach—often involving custom programming.

Arch, for instance, decided to make sales-related portions of its back-office data available on the mobile devices. To make sure that the information on the wireless systems was continually up-to-date, it contracted with Colorado Springs, Colo.-based Mobilize and Wellesley, Mass.-based Orchid Systems to extend back-end applications and manage data between the wireless units and the back-office database. Arch found it easier to go with a third-party vendor because the company didn't have the resources in-house to dedicate to the job.

Arch had to overcome the problem of getting existing data ready for display on screen-and-bandwidth-limited mobile devices.

Faced with mounting competition from the likes of Metrocall, SkyTel and Verizon, Schmersahl bet that the answer was allowing the sales team to interact with customer information and enter orders while on the go.

Mobile Move

That bet paid off, but not without facing a few hurdles. For instance, Arch had to overcome the problem of getting existing data ready for display on screen-and-bandwidth-limited mobile devices. Fortunately, companies today have a variety of options for how to do that.

The techniques for transforming mobile data vary widely in complexity and cost. Companies simply looking to relay text or existing Web-based information to mobile workers, for example, could choose a wireless application service provider (WASP), such as Aether Systems or 724 Solutions. These companies use transcoders (also called Web scrapers) to skim the basic information from a website and make it accessible on a wireless device.

If a company plans to move beyond basic information sharing, however, a WASP probably isn't the answer. Updating databases, conducting transactions and interacting with CRM applications require

The Death of Cool

To its credit, Arch had figured out ahead of time exactly why it wanted to use mobile devices. But many companies don't, according to Becky Diercks, director of Wireless Research at Newton, Mass.-based Cahners In-Stat Group. "Often companies just get the idea that it would be cool to do, but they haven't really thought it through," she says. "For a mobile solution to succeed, there must be a legitimate business reason behind it."

Additionally, a mobile solution shouldn't be seen as a cure for desktop-based problems such as systems that are outdated or aren't functioning well. "If you have existing issues to contend with when it comes to the technology you're using, you're only going to compound it by extending it to a mobile device," says Omar Javaid, cofounder and chairman of Mobilocity, a consulting and system integration company focused on mobile computing.

And once you decide on a good use for

new products

RAID-y for Action

Advanced Media Services has announced upgrades to its DakotaRAID family of network attached storage devices. **DakotaRAID Version 3.0** includes new features, including file level security, NFS Version 3 support, SNMP support and remote mirroring. Hardware updates include an Ultra2SCSI LVD bus on SCSI versions and a new Ultra ATA platform with six channels, support for 12 drives and a maximum capacity of 900GB. The products support RAID levels 0, 1 and 5 and offer a Gigabit Ethernet option. Pricing begins at $4,395 depending on options. For more information, visit *www.amsstorage.com* or call 800 466-0813.

Power with an Edge

Dell Computer has released the first of its Intel Itanium processor-based servers, the **PowerEdge 7150**. The system is a rack-mounted server intended for large-scale, enterprise applications. The 7150 will support as many as four 733MHz or 800MHz Itanium processors, as much as 64GB of RAM, and as many as four hot-pluggable hard drives. Systems will start at just under $20,000, with a mid-range, two-processor, 16GB version costing less than $30,000.

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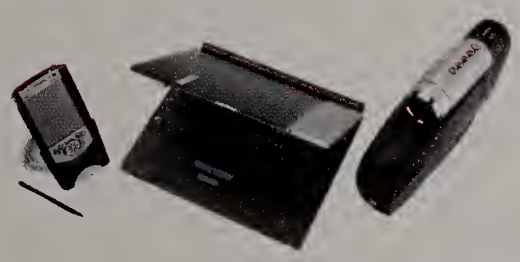

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COMPAQ
Inspiration Technology

mobile tools, it pays to design your applications carefully. "You have to deliver very targeted data," says Hira Advani, director of e-business technology in IBM's CIO office. "Otherwise, your solution can become counterproductive by tying up the mobile workers' time."

Keeping that in mind, Arch decided to deliver only the specific pieces of customer information that each salesperson needs to conduct transactions completely and correctly.

"Each salesperson has a mobile device loaded with a database of customer information," Schmersahl says. "When they are out in the field, they can configure an order on their wireless device and transmit it directly into our back-end system. They don't have to pick up a phone to call in the order or write it up manually. We save time and money and our customers get more accurate orders."

Following the implementation of the mobile package from Mobilize Solutions, Arch achieved an order-entry cost savings of nearly $800,000 annually through call center cost reductions, brought order rejection rates down 90 percent and saved more than $430,000 a year on inventory reconciliation costs.

Do It Yourself

In February, Sears, Roebuck and Co., based in Hoffman Estates, Ill., took a different approach to making its data wireless-ready. It began programming nearly 15,000 Symbol Technologies wireless Palm OS-based handheld computers to perform in-store, browser-based applications such as inventory, price change, merchandise pickup, receiving and replenishment. Unlike Arch, Sears customized its data inhouse to make its back-end database perform effectively with the Symbol devices. Bridging the devices required several weeks. But now that those bridges exist, they require very little extra data tweaking.

"The primary benefit is having the information required to do your job at the point your job is being performed," says Mike LeRoy, director of retail systems for Sears. "For us, it translates to increased productivity, better customer service and better sales because you ensure everything in the stockroom is represented on the selling floor."

Today's hot mobile technologies may not stand up to the test of time as their market emerges.

For Sears, implementing the mobile solution went fairly smoothly, although moving some data from the Web to the mobile unit proved challenging. "Some of our webpages that contain processes and procedures had to be reformatted so that they were viewable both on a desktop screen and from the Palm," LeRoy says.

Never Walk Alone

While Sears worked by itself to bring its applications and data to mobile devices, that approach won't work for every company. Partnerships may prove the rule rather than the exception, so it's important to find a partner that can help you achieve your wireless goals, is viable, clearly spells out what it can offer, and can provide the support and training you'll need postimplementation.

First, be wary of hype. "Don't necessarily believe a vendor that tells you it can support all devices," says Adam Zawel, an analyst with the Yankee Group. "It might be able to support some functionality on several devices, but if you dig a little deeper, you'll find it doesn't support all the things you want to do on the device."

new products

The system is available with enhanced enterprise service plans, including Dell's Premier Enterprise Support Service Platinum and Gold Tiers, which include technical account management, engineer-to-engineer support, and extensive hardware and software support. Customers can also purchase consulting and deployment services at additional cost. For more information, visit *www.dell.com* or call 800 999-3355.

Quick Cache

Looking to further enhance its Accelerator Enterprise Caching product, **Expand Networks** has released **ExpandOS 3.5**. The latest version of the operating system offers remote monitoring, a browser-based user interface and Congestion Management Queuing, which provides several options for dealing with traffic management, depending on which protocols need highest priority. The updated operating system is available in Expand's Accelerator 4000 product. For more information and pricing, visit *www.expandnetworks.com* or call 888 892-1250.

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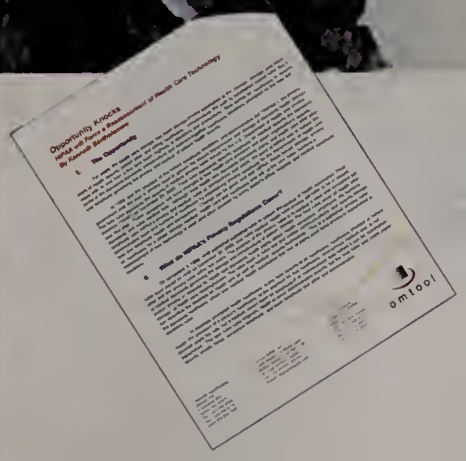

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Also, don't underestimate the task at hand. "The most important step is to make sure you have a partner who can deliver a solution that can be completely integrated," says Arch's Schmersahl. "As you [put] piecemeal things together to try and find the right wireless network and the right developer and the right back-end system, the workload becomes quite oppressive."

Additionally, taking the time to educate workers properly and introducing the mobile solution through a pilot project can improve your chances of success. Sears's LeRoy, for example, says he'd approach training differently if he had to do it over again. "I would go through an orientation on browser use," he says. "We did more of a hands-on approach, but we probably should have invested some time up front educating folks in the nuances of working in the browser world rather then assume they were familiar with it."

Hidden Hurdles

Even if you approach a mobile project carefully, problems still lurk. Today's hot mobile technologies may not stand up to the test of time as their market emerges. Mobile standards are in a constant state of flux. New devices arrive every week.

XML and Java may eliminate the need to format content multiple times for various types of mobile device displays, but whether these standards will survive in the long term is also uncertain. "XML will probably make some of today's tools obsolete. And it will probably be obsolete itself because it's not really made for video streaming and those types of applications," says Cahner's Diercks. "Its use is somewhat limited."

The caveats, however, certainly haven't stopped mobilization in its tracks. According to analyst company Gartner, there are 60 million mobile workers in the United States today. *Mobile Computing* magazine estimates that 40 percent of all white-collar workers in the United States have a mobility-related component to their jobs. Those numbers mean mobile solutions are primed for growth. And with growth should come standards—and a simpler process for getting data mobilized.

That fact raises a question—is now the time to go mobile, or is it better to wait until the market stabilizes?

"You first need to ask why you want to go to a mobile solution. What would your workers and customers gain from it?" asks Yankee Group's Zawel. "And second, is this something I need to be a first mover on? Is this something that can wait?" ■

J. Brown, a freelance writer and editor based in California, has been writing about technology and business issues for the past eight years. E-mail her at *justinebrown@quiknet.com*.

PREDICTIONS
Ethernet market

Gigabit and Wireless to Rule the Future

THE NETWORK INTERFACE card market is going to drag for the next couple of years, but it will see resurgence thanks to an uptick in gigabit and wireless product sales, according to a report from Cahners In-Stat Group.

The report "Network Clients Market: Getting Fast and Mobile" predicts that the overall LAN interface client market will grow from $3.1 billion this year to $5.5 billion by 2005. Increasing bandwidth demands in the server environment are already driving gigabit card sales in that area, with desktops slated to follow suit in the coming years.

Wireless solutions, such as those based on the 802.11b and 802.11a standards, will also drive sales of new network cards, with the report noting that such products will find places in both businesses and homes as connections to residential gateways that share broadband connections.

–Christopher Lindquist

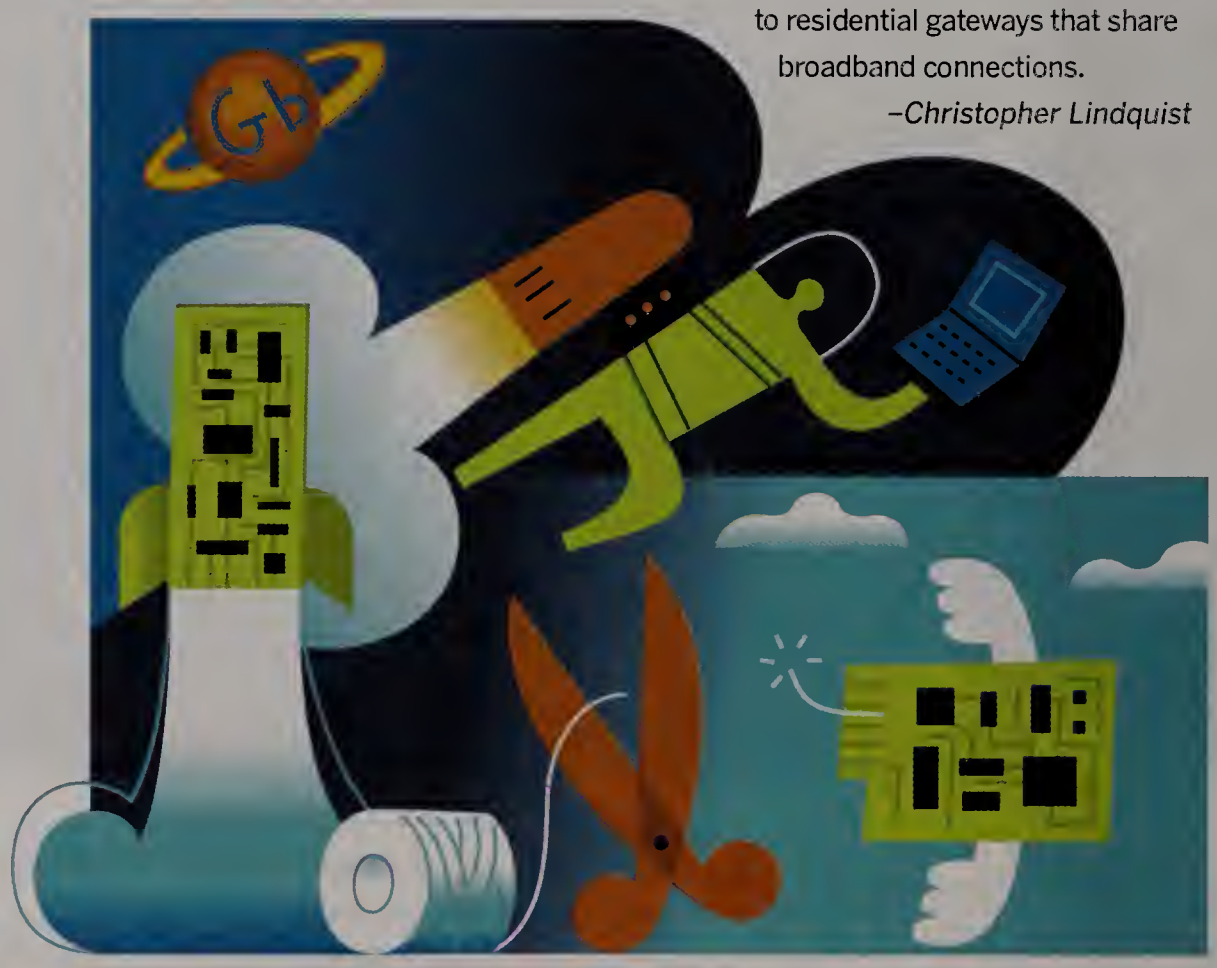

ILLUSTRATION BY DOUG ROSS

CIO PERSPECTIVES

October 14 – 16, 2001
The Westin Mission Hills Resort
Rancho Mirage, California

Changepoint Corporation
Citrix Systems, Inc.
E.piphany, Inc.
FiPass
Information Builders, Inc.
Intel Corporation
Intel Online Services
Kintana
Kyocera Mita America, Inc.
Legato Systems, Inc.
Lockheed Martin Global Telecommunications
NetScout Systems, Inc.
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Totality
Tripwire, Inc.

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THE INTERNET and related technologies have spawned entirely new business methods and models; virtually every organization has new e-business units headed by managers with titles unknown just a few years ago. CEOs, CFOs and other CXOs have more to say about the technology decision-making process, while CIOs are expected to contribute more to the business strategy. The definitions of customer and partner have changed — and their expectations of your company have changed as well.

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ROBERT COHEN, vice president & CIO, and DR. JAMES PUSEY, vice president of marketing, AstraZeneca, on the prerequisites, process and benefits of co-evolving business and IT strategies.

J. BRIAN FERGUSON, president, Chemicals Group, and ROGER K. MOWEN, vice president, Global Customer Services Group & CIO, Eastman Chemical, on developing relationships that enable the business to grow.

MARTHA HELLER, the force behind *www.cio.com*'s Sound Off, and now director of its Best Practice Exchange. She brings along a panel of CIOs willing to share both visions and nightmares.

JANEY PLACE, executive vice president, E-Commerce Strategy, Mellon Financial Corporation, on how you get everyone to understand, accept and begin acting in new roles when it comes to e-business.

RICK SWANBORG, president and founder of ICEX. In his time, a manager, consultant, researcher, and entrepreneur; now, head of a research and content management firm dedicated to helping business leaders make better decisions on leveraging information technology.

BRUCE TULGAN, author of *Winning the Talent Wars*, on the new attitudes of Generations X and Y toward the traditional employment relationship, and what these very different voices can contribute to our organizations.

DR. JAMES WETHERBE, our conference moderator, professor of IT at Texas Tech University, on aligning clicks with bricks strategies.

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REVISIT
data warehousing

Smart Decisions

Decision support systems have become critical business tools

BY FRED HAPGOOD

IN THE MID-1980S, when Ralph Kimball started selling what were then called decision support systems, he felt he was working less against normal buyer skepticism than against the culture itself. Decision support systems (DSSs) were and are methods of filtering aggregate numbers (such as total sales per week) out of the data generated by the transactional devices (such as cash registers, telephone switches, ATMs, bar-code scanners) that pervade everyday life. The beneficiaries of those systems were supposed to be managers, and the logic of the case was easy to make, or so Kimball thought.

Unfortunately, the consensus at the time was that real managers did not depend on numbers. Manly managers went down to the floor or out into the field (a.k.a. the front lines), rolled up their sleeves, got their hands dirty and managed by intuition. Those who managed by numbers were called bean counters, among other, less neutral terms, and were universally derided as a pallid, thin-lipped tribe with no human sentiments. No one wanted to be a bean counter, and the DSS industry suffered accordingly. Year after year the same 100 to 200 people would show up at the industry conferences. Then one year—he thinks it was 1993—Kimball stepped up to a podium and saw an ocean of unfamiliar faces in front of him. "What happened here?" he remembers asking himself.

Part of the answer was that a new generation of managers—the children of VisiCalc and Lotus 1-2-3—was taking over. They had cut their teeth on text about lean manufacturing and total quality management, philosophies that emphasized the importance of transparency, and large, dynamic flows of information. Since DSS was in a position to supply that need, doors began to open. *CIO* reflected and advanced that change, arguing in an article ("Information Preservation," July 1993) that

ILLUSTRATION BY BETH ADAMS

the technology allowed managers to "make intelligent business decisions faster."

As often happens, with success came a new name: *data warehousing*. The moniker was probably a step backward in terms of clarity, since strictly speaking a data warehouse is just one piece of a DSS. (An entire DSS includes a transactional device that produces the raw data, software that filters this data and writes it into storage—the latter being the actual warehouse—and a client on the manager's desk for probing the warehouse.) On the other hand, the new name provided the impression that an updated technology had arrived, which never hurts.

During the '90s the industry grew steadily, with revenues reaching into the low billions, according to an IDC report from the period. Toward the end of the decade, the technology underwent another change. Before then, analysts measured growth by the number of installations; in the late '90s the number of users per installation also began to grow. Partly this reflected changes in utility: As hardware grew faster and cheaper, data warehouses were able to remember more types of data at finer levels of detail, allowing quicker responses to more questions. Vendors built systems specialized on department-level missions, such as ERP or CRM, which simplified interfaces and training. (Those are sometimes called data marts.) New categories of data, such as clickstream, which can capture the behavior of specific customers on a granular level, opened up for filtering and analysis.

As those changes worked their way through the market, data warehousing changed from an analytic tool, whose users were concentrated in senior management, to a platform for distributing quantitative material to every corner of the enterprise. Querying the data warehouse became an integral part of almost everyone's job routine.

Some observers see this change as the cusp of a new era, in which data warehouses become the language, even the skeleton, of the enterprise itself. From its earliest days DSSs have required managers to impose consistent, rigorous definitions of objects and processes, such as sales or product names or regions or dates. At the time that was more of a nuisance than a feature, but today it has become clear that the possibilities of both large-scale collaborations among enterprises (and departments) and software-based intelligence depend on establishing the largest possible library of unambiguous, enterprise-specific references. "The warehouse has become a data hub, gathering information from both operational systems and users," says Richard Tanler, CEO of Minneapolis-based e.Intelligence, a vendor that utilizes the data warehouse as the foundation for planning and predictive intelligence.

Certainly Kimball no longer worries about getting his calls returned. Along with his wife Julie, he now operates Ralph Kimball Associates in Boulder Creek, Calif., which in turn runs Kimball University, "the authoritative source for data warehouse education." He does offer private consulting, although according to his website, Ralphkimball.com, he has little time for public speaking. Kimball stuck with his technology when it was languishing on the periphery, and now he is collecting a return on that loyalty. There may be a lesson in that; if not, we should all be so lucky. ■

Querying the data warehouse became an integral part of almost everyone's job routine.

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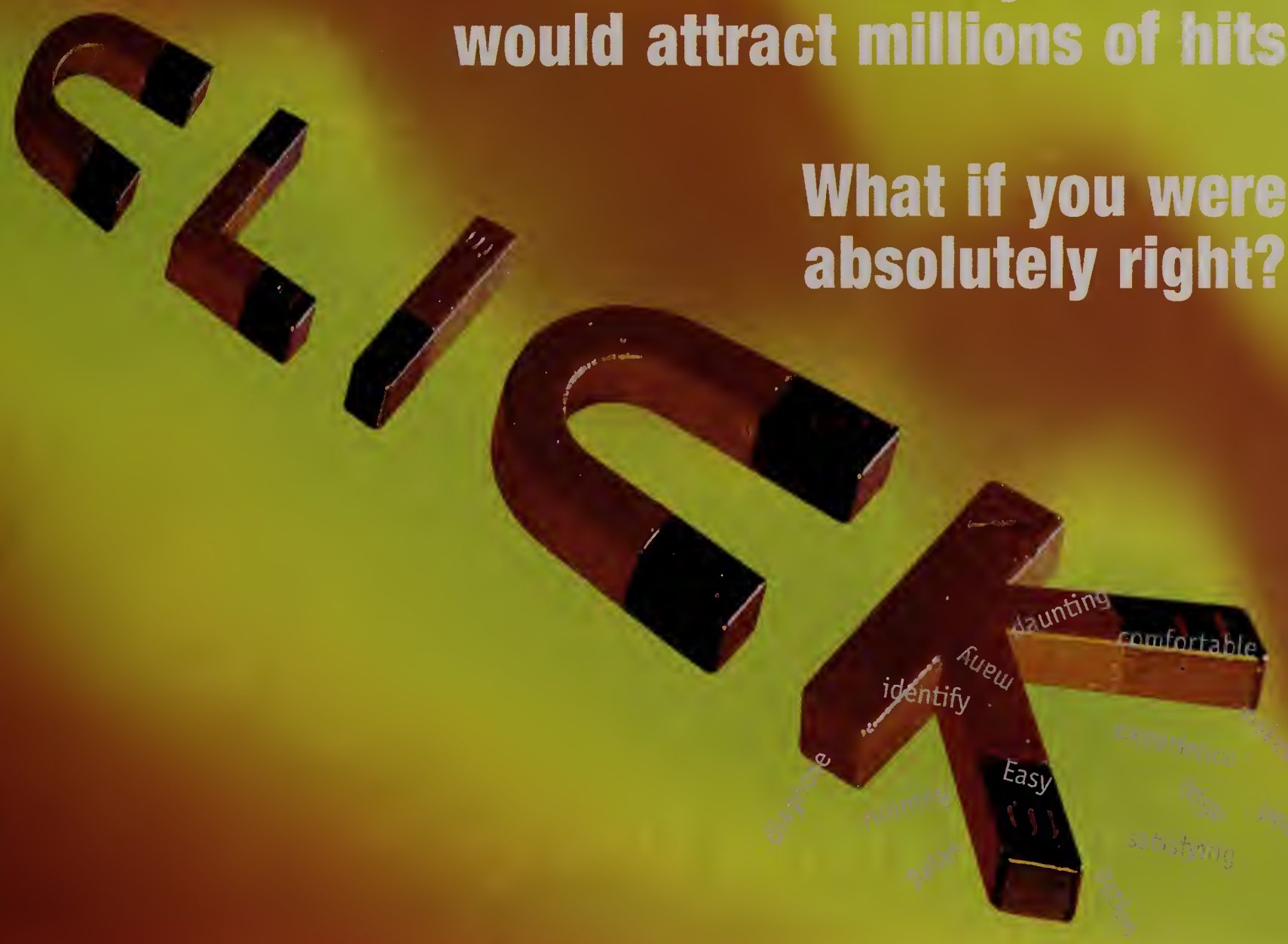

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UNDER DEVELOPMENT
new memory

Thanks for the (much better) memories

NOT LONG AGO, solid-state memory was slow, limited in capacity and, worst of all, volatile (whatever data the memory contained would vanish when the power went off). Volatility spelled vulnerability. The earliest PDAs, left untended and unplugged, eventually lost everything—files, the operating system, applications and whatever else resided in the memory-on-a-chip that permitted the device's compact form. Then came Flash memory, which wrought a revolution in pocket computing. The new memory held data indefinitely without the need for external power. Best of all, it was cheap. As a result, Flash provided the technical foundation for today's PDAs and smart phones, and by extension, for the whole mobile data industry.

But Flash is relatively slow compared with the volatile memories it replaced; it degrades over time and uses considerable energy—hardly an ideal situation for products often powered by a couple of batteries. Those limitations quickly prompted the search for successors.

Three such next-generation technologies are currently vying for the huge Flash market. MRAM (magnetic read only memory), FRAM (ferroelectric RAM) and OUM (ovonic unified memory) all claim similar performance advantages: low voltage operation, long life span and very high speed. They reach those goals in different ways, though in each case an innovative material technology lies behind the performance breakthroughs.

MRAM, pioneered by Motorola and IBM, stores bits of data as changes in electrical resistance in the memory cells—produced by exposing certain exotic materials to magnetic fields. OUM, invented by researchers at Ovonyx, in Troy, Mich., also stores data as variations in resistance but creates those variations by changing the crystalline structure of substances known as chalcogenide alloys. FRAM, developed by Colorado Springs, Colo.-based Ramtron, and licensed to Fujitsu, Hitachi, Texas Instruments and Toshiba, is significantly different from the other two: It stores bits as fixed electrical potentials (voltages) within ferroelectric materials.

Flash provided the technical foundation for today's PDAs and smart phones.

Only FRAM is produced today, though the low memory capacity of current chips (64KB) has restricted it to telemetry applications. MRAM has already surpassed FRAM in capacity, achieving a 256KB figure a scant three years into its development cycle, but fabrication issues still need to be sorted out. OUM's prospects are even less clear. While its basic materials technology has already proven successful in recordable optical discs, the one major chip manufacturer committed to OUM development—Intel—isn't saying much.

Industry analysts generally believe that MRAM has the edge, though they admit that FRAM and OUM are still in the running. But everyone agrees that perfecting any of them would have significant consequences, effectively obsolescing Flash, permitting the fabrication of complete systems-on-a-chip (making for even smaller devices) and ultimately even replacing all but the fastest solid-state memories.

–Daniel Sweeney

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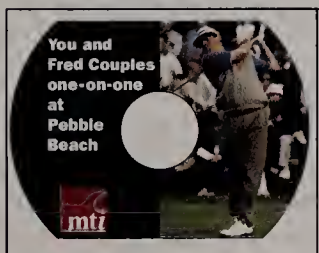

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Company Index

724 Solutions Inc. 148
Abide Idea Co.. 84
Advanced Media Services Inc. 148
Aether Systems Inc. 148
Apple Computer Inc. 129
Arch Wireless Holdings Inc. 148
Arula Systems Inc. 148
Ascend Software Inc. 148
Cahners In-Stat Group 148
Cambridge Technology Partners 52
Coca-Cola Co., The 118
Computer Economics 26
Concurrent Computer Corp. 52
Dell Computer Corp. 148
DiamondCluster International Inc. 62
E.I. du Pont de Nemours and Co. 84
E.Intelligence Inc. 148
Evergreen Packaging Equipment 72
Expand Networks Inc. 148
Federal-Mogul Corp. 62
Fel-Pro Inc. 62
Ford Motor Co. 118
Fort Point Partners Inc. 106
Gartner Inc. 90
Gateway Inc. 129
GEN3 Partners Inc. 52, 90
General Mills Inc. 84
Guardent Inc. 52
Hartman Group Inc., The 84
ICEX Inc. 16, 52
IDC 52
Inventure Group, The 84
Kuczmarski & Associates 52, 118
Mercer Management Consulting Inc. . . . 78
Meta Group Inc. 52, 118
Metrocall Inc. 148
Mobilize Inc. 148
Mobilocity Inc. 148
Orchid Information Systems Ltd. 148
Ovonyx 148
Portland Cement Assoc. 78
Ralph Kimball Associates 148
Ramtron International Corp. 148
Sears, Roebuck and Co. 148
SecurityFocus.com 26
SkyTel Communications Inc. 148
Strategos 52, 118
Symbol Technologies 148
Verizon Communications Inc. 148
WebWare Corp. 106
West Pharmaceutical Services 72
Xerox Corp. 118, 129
Yankee Group, The 148

Continued on Page 166

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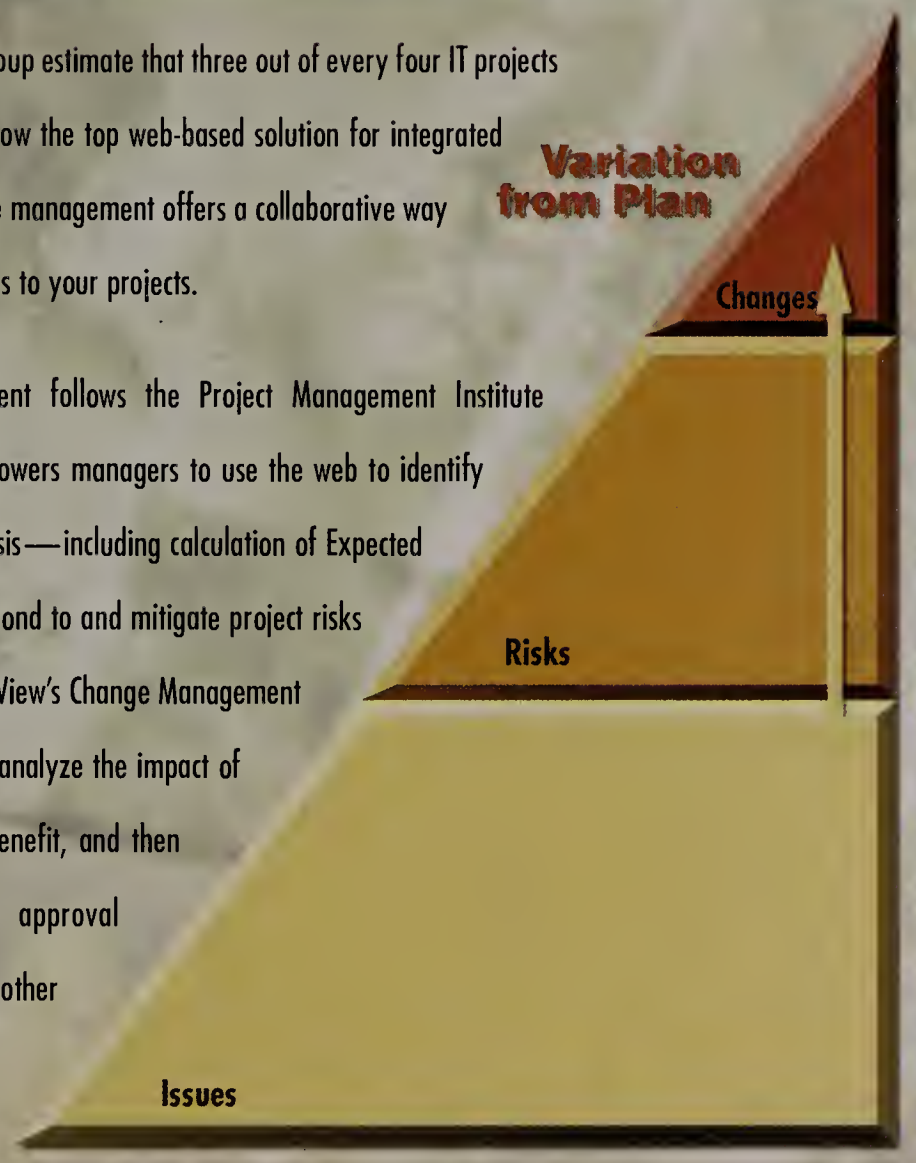

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Index of Companies and Advertisers *Continued from Page 164*

Ad Index

3COM Corp. 65
Acxiom Corp. 99
Apogee Networks Inc. 145
Availability.com 127
Avaya 105
Bindview 23
Brainbench 125
Check Point Software 89
Chevron 81
Cingular 147
Compaq Computer Corp. 149
Computer Associates Intl. Inc. C4
Crossworlds Software 59
CXO Media Inc. 45, 113, 119, 126, 153
Data Junction Corp. 121
Digex 97
EDS Corp. 123
Empirix 100
Epicor Software 75
eshare communications 144
GE Access 50
Genuity 10
HAHT Commerce 128
Hitachi Data Systems 143
iAnywhere Solutions 77
IBM Corp. 49, 133, 135
Infonet Services Corp. 137
Information Builders 103
Informio 67
Iona C3
Kronos Inc. 93
McData 139
Mercury Interactive 29
Microsoft Corp. C2, 17, 24, 60
MTI 161
NEC/Mitsubishi 2
NETg 167
NetScout Systems Inc. 31
Omtool 151
Oracle Corp. 69
Pathlore Software Co. 87
Peoplesoft Inc. 47
Planview 165
Predictive Systems Inc. 55
Primavera Systems Inc. 163
Princeton Softech 71
Samsung 115
SAP 14
SAS 27
SiteSmith 141
Sun Microsystems Inc. 9
Symantec Corp. 19
Tonic 159
Toshiba America Inc. 6
Ubizen 57
Unisys Corp. 20, 21
United Messaging 5
Verizon 131
Western Multiplex. 83
WorldCom 95
XO Communications 13
Yipes (regional) 119

Coming in *CIO*

Look for These Articles in Future Issues

Is IT a Boys' Club?

Female CIOs make up a small fraction of those who populate the executive suite. And a new generation of experienced women waits in the wings for their chance at the title of CIO. The old excuses about there not being enough qualified women or that few women are pursuing degrees in computer science and engineering no longer apply. We ask women in the industry what they think is keeping them down.

Site Fright

As dotcoms continue to bite the dust, some brick-and-mortars are responding to the sagging economy by cutting back on their Web initiatives. Not so fast. We take a look at what's working on the Web by profiling sites that are making money, handling heavy traffic and pushing the envelope on the Web.

Saving Too Much?

Forward-looking CIOs have realized that backing up absolutely everything—just in case the original files are damaged—is not always the best way to manage files. Find out how to build electronic record keeping into your knowledge management system, and learn who in your company can help you manage the content in your digital files.

The New Rage in Exchanges

A year ago, it seemed as if every large company was signing up to participate—if not buying a stake—in a public electronic exchange. Now, as many public marketplaces fold—or simply fail to deliver on their promises—private exchanges are gaining popularity. What's a CIO to do? We'll help you decide.

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Time Piece

Tools that Ruled

Lighten Up

PHOTO BY ALAN ABRAMOWITZ/STONE

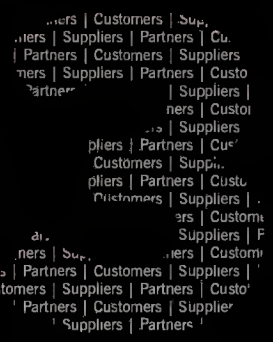
AS EVERY THIRD-GRADER KNOWS, Thomas Edison invented the electric lightbulb.

Or did he? It's painful to cast aspersions on the reputation of one of America's heroes, but Edison, who patented his bulb in 1879, merely improved on a design that British inventor Joseph Swan had patented 10 years earlier. Swan sued Edison for patent infringement, and the British courts ruled against Edison (as punishment, Edison had to make Swan a partner in his electric company). Even the U.S. Patent Office decided in 1883 that Edison's patent was invalid, as it also duplicated the work of another American inventor.

As it happens, Swan and Edison worked from bulb designs that had been in use since the early 1800s. The general principle was, and still is, this: When electrical current flows through the bulb's filament, the filament heats up and glows, which produces light. The inside of the bulb is a vacuum, hence oxygen-free, so the filament doesn't get oxidized and the glow lasts a long time.

Swan used a carbonized paper filament, but the poor quality of the vacuum in the bulb caused the carbon to disintegrate rapidly, so the bulb glowed for just 13-and-a-half hours. Edison used a better vacuum pump, and after he and his posse of assistants had tested thousands of materials, he made a filament derived from bamboo that lasted up to 1,200 hours. Today's incandescent bulbs, in which the filament is made of tungsten, last about 1,500 hours. CIO

What inventions light up your life? Tell Features Editor Sara Shay at *sshay@cio.com*.



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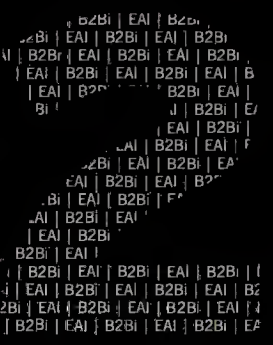

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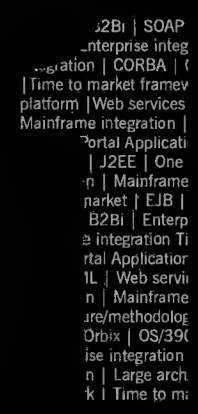

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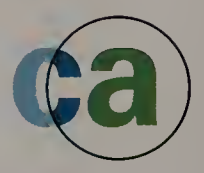

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